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The OIL WEEKLY

OIL and GAS ENGINEERING

FOR OIL AND GAS PRODUCTION AND PIPE LINE DIVISIONS

THE WEEK'S NEWS INTERPRETED

JULY 17, 1933
ne 70 Number 5

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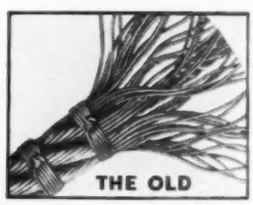

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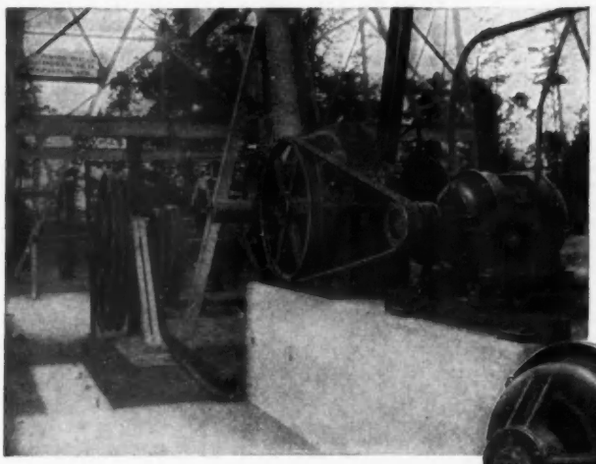
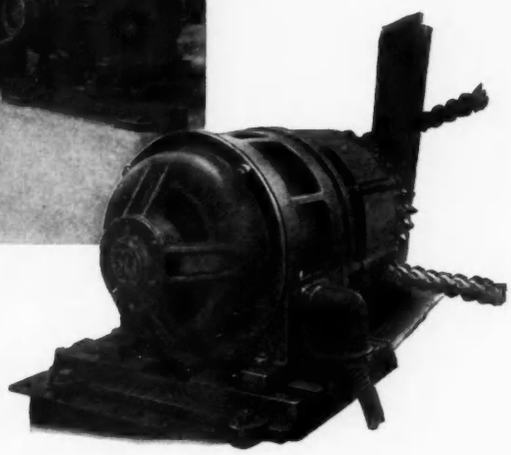
PRESENTING

Two G-E Motors for new economies in pumping



A G-E triple-rated Y-Delta induction motor driving an oil-well pumping rig in the East Texas field



G-E gear-motor operating an oil-well pumping rig in a Gulf Coast oil field, Texas

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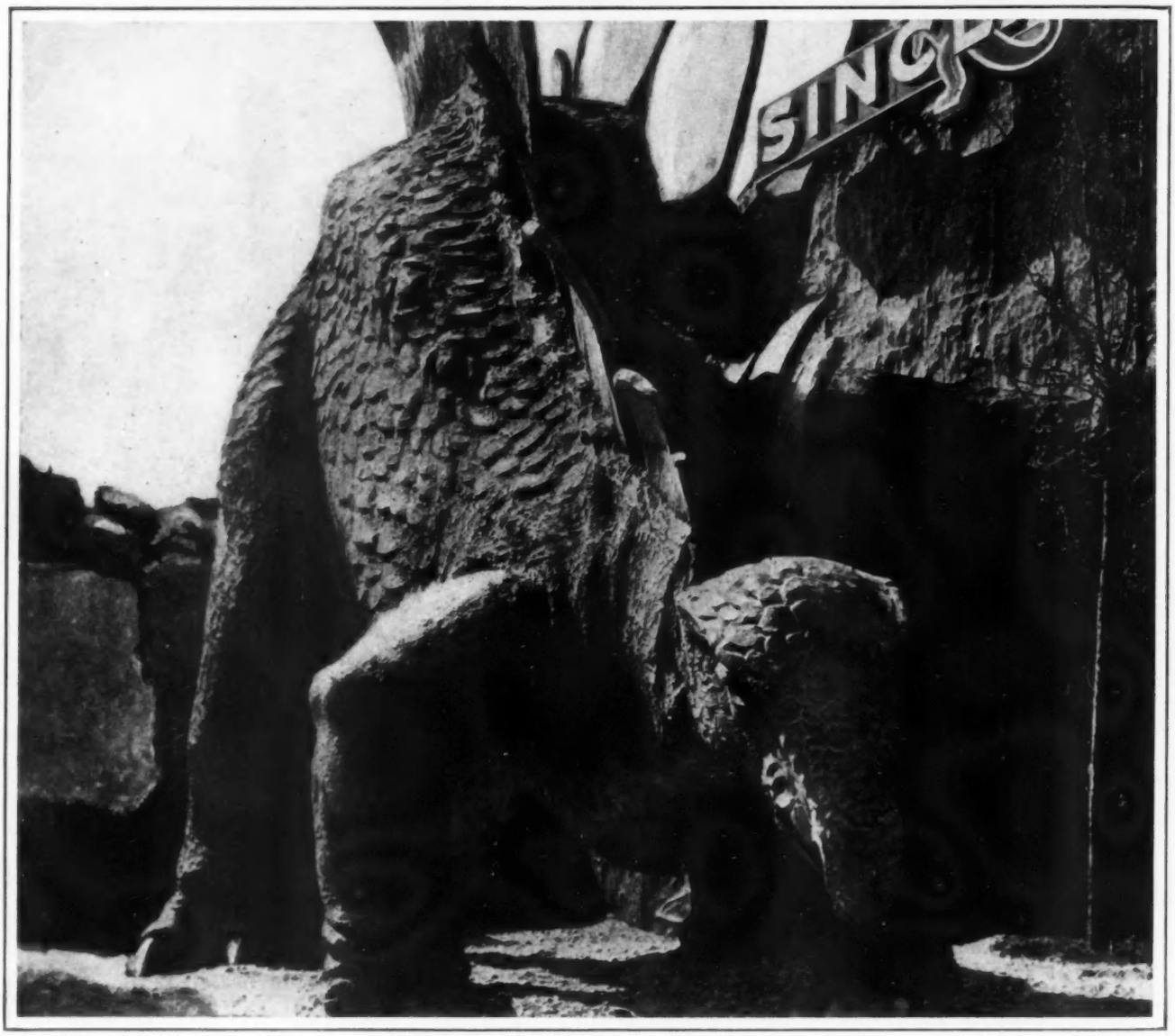

PICTURED above is one of the dinosaurs in the Sinclair exhibit at the World's Fair. This is a 25-foot Stegosaurus or Spine-Armored Dinosaur who lived during the Jurassic Period of the Mesozoic Age. This creature had both front and rear brains. The rearmost probably controlled movements of its spine-armor and hind legs. Sinclair built this exhibit to emphasize the great age of the crudes used in Sinclair Motor Oils. Attendance is averaging better than 1,000,000 people monthly.

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THE OIL WEEKLY

JULY 17, 1933
VOLUME 70, No. 5

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S. W. ROBINSON
Editor

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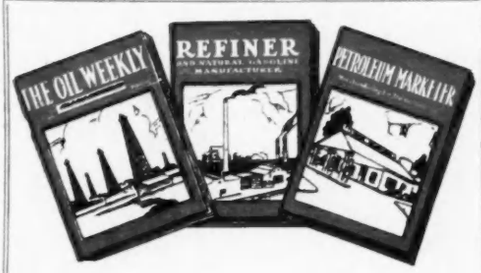

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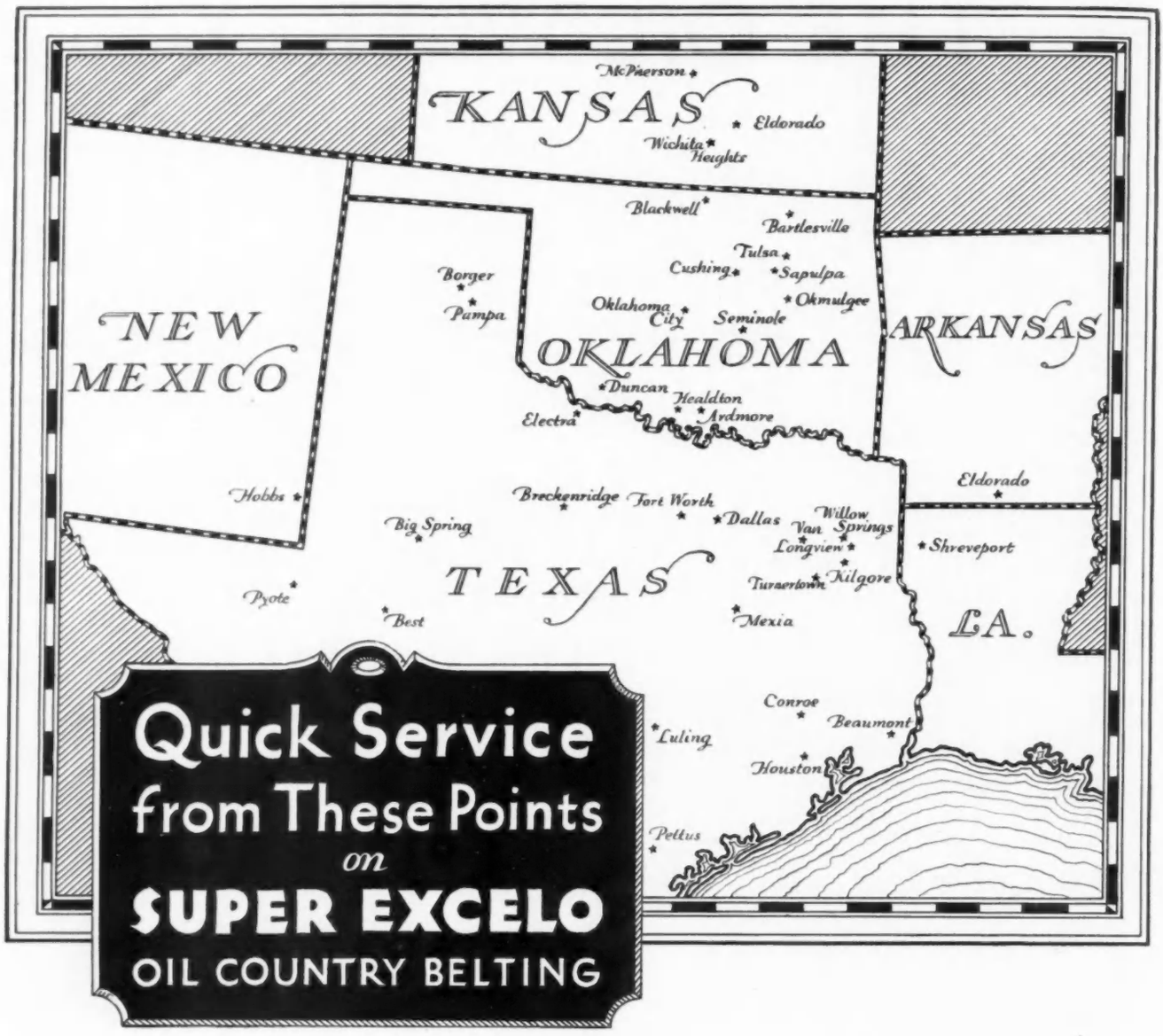

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THE OIL WEEKLY

FOR OIL AND GAS PRODUCTION AND
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ENGINEERING • NEWS • STATISTICS

The Changing Panorama

In the matter of controversy the petroleum industry still rules consistent. This subject will hold place number one when General Hugh Johnson bangs his gavel July 24 and opens discussion on the Code of Fair Practices. By filing a supplement, the Chicago draft of the code came in with something definite on wages and hours of work.

But the independent wing, led by John B. Elliott, will hold out for a 36-hour week, whereas the Chicago draft specifies 40 hours as the maximum. There will be a plea for 50 cents an hour as a minimum wage against a 40-cent minimum in the other code.

There will be at least two other codes up for consideration, one from the Texas Independent Refiners' Association and another as drafted by the Arkansas-Louisiana refining group.

The debate that will come before the federal administrator on the lease and agency method of service station control will add words galore to the discussion.

The progressive step comes because the industry has at last done enough to get its date of hearing set. But it was not to the credit of those who deliberated at Chicago that the draft from there carried only general reference to wages and hours of labor. The petroleum industry has excellent examples of its treatment of labor. Instead of passing over the subject with soft words, it should have been specific.

There is, however, the possibility that a general order as to wages and labor will set this question at naught for the hearing. Evidently Washington authorities are weary of the delay of industry as well as all controversy as to wages and labor. Drafters of codes should accept as their first task that of getting down to definite figures on these subjects.

In this instance the fact that the oil industry carries through to retail sales is in large part responsible for the controversy. In naming a minimum wage and hour rate, some groups have in mind only those laborers engaged in producing and refining. Other groups must consider service station employes. This suggests a double rule. No other major industry is called upon to group manufacturing and sales employes under a single code, and probably no retail selling organizations will limit hours to 30 per week.

Roosevelt Supplies the Club

At last this industry has an opportunity to demonstrate how determined it is about keeping oil field ouput within current consumption. The executive order of President Roosevelt places this question squarely up to the industry.

As yet the administration has provided no special

Magnolia Petroleum Company's Rudel 1, expected prior to completion to become Tomball's best oil producer, not only developed into a mere gasser when completed in Cockfield sand at 5528 feet, but blew out and is not yet under control.

machinery for enforcing the executive order. Those in Washington understand that the Interstate Commerce Commission will put its own forces to work to halt the movement of either crude oil or refined products from moving across state lines when the source is oil produced in excess of a valid order of a conservation body of a state.

But no federal agency is equipped for sudden action on this question. The situation calls for prompt action rather than lengthy investigation. A few indictments will be sufficient to keep East Texas or any other oil field within bounds. Men go into state courts with fingers crossed. But they go into federal courts with weakened knees if an indictment must be answered.

The Texas Petroleum Council should be complimented for its move to provide assistance for whatever federal agency undertakes the investigation. The organization it proposes will provide evidence quicker than any set of federal investigators can provide it.

East Texas is the center of the "hot oil" racket. That is the place to make a test of law enforcement. Unless excessive production can be halted, no further effort need be made. If it is halted there, victory rests with those who have called for enforcement for more than two years.

The Oil Man's Calendar

JULY

19-25 *World Petroleum Congress, Imperial College of Science and Technology, So. Kensington, London, England.*

20 *Code Hearing, Washington, D. C.*

22-29 *International Geological Congress, 16th Annual Session, Washington, D. C.*

25 *Statewide Proration Hearing, Austin, Texas.*

SEPTEMBER

20-22 *National Petroleum Association, 31st Annual Meeting, Traymore Hotel, Atlantic City, N. J.*

25 *American Gas Association, Natural Gas Department, Chicago, Illinois.*

Week 25 *International Gas Conference and 15th Annual Convention, American Gas Assn., Stevens Hotel, Chicago, Illinois.*

OCTOBER

24-26 *American Petroleum Institute, Fourteenth Annual Meeting, Chicago, Illinois.*

NOVEMBER

American Association Petroleum Geologists, Pacific Section, Los Angeles, California.

Pumping East Texas?

When will East Texas pump, and how, has been a question of major importance for some months, both to the operators who must buy and the equipment makers who will sell the millions of dollars worth of equipment required. Differences of opinion on "how" will lead to every type of pump with every type of primary power being used, and "when" will be governed by events which follow the inevitable despite proration authorities. But a study of under-ground conditions permits a reasonable forecast of the order in which sections of the area will require pumping. Also the same conditions point to the types and weight of equipment required to handle the problem to the best economical advantage. The water problem, too, is still present although not in such alarming magnitude as was the early estimate. Page 28.

"Taking coals to Newcastle" might be modernized to some comment about piping gas to East Texas. But whether imported or indigenous, gas is in ample supply for use of internal combustion engines for pumping requirements. Gas distributing lines form a network throughout the producing area. Page 41.

Estimates have been made that at least 4000 East Texas wells will operate on electric power when they go on the pump. Contracts have been signed for equipment of this class for a large number of wells. Power interests serving the field have lines to all corners, and efforts are being made to iron out some of the ever-present differences on rates. Besides that, a number of producers plan individual generating units. Page 54.

Previous experience with air-gas lift in oil production has been recovery of the maximum quantity of oil in the minimum time. It is on this basis that conservation authorities frown upon use of the method. But it appears that another use of the lift is to economically recover oil in stated quantities to meet proration requirements as in East Texas. Page 59.

At last the Attorney General of Texas has completed a conviction for violation of East Texas proration orders of the Texas Railroad Commission. An agreed fine of $1000 was paid following conviction of over-production while the field was shut down.

There was secrecy about the matter and it did not become public until several days had passed. Reporters around Austin are under the impression that a trade was made and that the fine was paid under promise of the fact not being made public.

Washington Moves to Enforce "Hot Oil" Order

Assistant Solicitor Fahy appointed to investigate and prosecute violations

WASHINGTON, D. C., JULY 14.

REGULATIONS under the President's order prohibiting interstate or foreign transportation of illegal oil will be issued as soon as possible by Secretary of the Interior Ickes, who today announced that the matter would be under the supervision of Assistant Solicitor Charles Fahy, with Louis R. Glavis, director of investigations, in charge of the field work. The regulations will be administered in a separate section created in the Bureau of Investigation.

Action of the administration in providing for immediate enforcement of the "hot" oil order was expedited by reports that, following announcement of the order July 11, attempts were made to move a large volume of oil to eastern consuming centers.

"The movement of nearly 600 tank cars of illegally produced oil from the East Texas field, begun yesterday, reported by our organization to the administration, emphasizes the importance of the executive order issued by President Roosevelt forbidding interstate transportation of petroleum produced in violation of state law," said Russel B. Brown, counsel of the Independent Petroleum Association of America. "While no attempt has yet been made by federal or state authorities to check these shipments, steps may be taken to intercept them before they reach thir destinations.

"The shipment of illegal oil from the Gulf Coast by tanker to New York, in the attempt to rush this petroleum to market before the President's order can be made effective by regulations, may prove costly to the shippers since this oil may be held up when it reaches New York harbor, entailing considerable expense as well as possible penalties for those guilty of violation of the presidential order."

No part will be taken by the national recovery administration in enforcement of the illegal oil restrictions, it was announced today by General Hugh Johnson. At the same time, Johnson made it clear that while the oil industry would set up a committee for administration of its code, a close check would be kept on the committee's activities.

"The theory is this," he explained. "Under industrial self-government the code will contain a provision for setting up a committee of the industry to administer its provisions. That is all right so long as we have three members on the committee and we will intervene to whatever extent is necessary to protect the public interest. In the case of most industries this offers no problem, but the oil industry differs from most of the others in that it practically asks for a czar. I do not think any industry should have a czar."

Asserting that the administration members on the oil committee will have to be a "pretty husky trio," Johnson declared that "the oil situation is a difficult one. You have there a constitutional question of the most important nature. We are going to ask the governors of the states to sit in on the oil inquiry, and if they cannot attend to send substantial representatives. In my mind before you get these problems solved you have to get something of a treaty among the oil states. It is easy to prohibit the transportation in interstate commerce of oil which violates state law, but the determination of what oil is 'hot' is in itself a hot question."

General Johnson himself will preside over the oil code hearing with Kenneth M. Simpson as deputy administrator in charge, assisted by a corps of experts.

Administrator Johnson today announced

(Continued on page 114)

Transportation of *Illegal Oil* *Prohibited* By President

WASHINGTON, D. C., JULY 13.

ACTING in response to a petition by the Independent Petroleum Association of America, supported by The Texas Railroad Commission, President Roosevelt July 12 issued an executive order prohibiting the interstate or foreign transportation of "hot" oil.

The petition seeking action by the President was filed July 7 by Russell B. Brown, counsel for the independent association. A supplemental petition was filed July 11, and on the same day the President was placed in possession of a statement by E. O. Thompson, of the Texas Railroad Commission, showing that while the East Texas allowable production is 541,000 barrels a day, total production for the week ended July 1 was some 160,000 barrels in excess of that amount.

Officials of the administration also were informed from other sources that shipments of the East Texas field are more than 225,000 barrels over the allowable amount.

The President's order was issued under authority of the amendment to the National Recovery Act sponsored by Senator Tom Connally of Texas.

"By virtue of the authority vested in me by the act of Congress entitled 'An Act to encourage national industrial recovery, to foster fair competition, and to provide for the construction of certain useful public works, and for other purposes', approved June 16, 1933," the President ordered, "the transportation in interstate and foreign commerce of petroleum and the products thereof produced or withdrawn from storage in excess of the amount permitted to be produced or withdrawn from storage by any state

law or valid regulation or order prescribed thereunder, by any board, commission, officer, or other duly authorized agency of a state, is hereby prohibited."

Stoppage of the movement of illegal oil is provided for in the code of fair competition drafted by the industry, but was held to be of such importance as to warrant immediate action, rather than to wait until the code has been submitted and hearings held.

It has been contended that the elimination of this oil would do much to increase employment in the industry, even in advance of the adoption of a code, it being asserted by Brown that "a few willful men employing only enough assistants to turn a few valves are producing more oil in excess of the legal allowable of their respective states than is legally produced by all the states east of the Mississippi, and all of the Rocky Mountain states, Louisiana, Arkansas and Kansas.

"In these areas where millions of dollars are invested and hundreds of thousands of men are normally employed and millions are dependent on this industry, companies are day by day driven into bankruptcy and armies of men are forced off the payroll by the illegal conduct thus permitted to continue."

It is not anticipated that the President's action will have any effect upon the oil industry code, which comes up for hearing July 24.

Commission Re-Issues Order On Tank Car Tenders

Austin.—The Texas Railroad Commission reissued orders July 13 prohibiting railroads from accepting crude oil shipments in the state unless accompanied by a tender approved by the commission and attesting that the oil had been produced in conformity with state conservation laws. The reissuance of this order followed the signing of the executive order by President Roosevelt to the effect oil or its products produced in violation of a valid state order cannot legally be moved in interstate commerce.

Records of the commission for July 7 showed that 577 cars of oil were moved out of the East Texas field that day with tenders as required by the commission. All of this oil moved interstate or to seaboard. Railroad companies have ignored the tender order of the commission when shipments were for interstate movement.

Federal Set-Up *Necessary to Stop Overproduction* in East Texas

Tyler, Texas.—Producers and purchasers of the 150,000 barrels, more or less, of illegal oil originating in the East Texas field daily are disturbed over being stripped of their advantage over law abiding competitors as result of President Roosevelt having signed an executive order July 12 that places a ban on interstate movement of illegally produced crude or products made thereof. But cessation of over-production in this field will not result as long as the present group of seasoned evaders is allowed to do business since they are experts in evading the proration rules set up by the Texas Railroad Commission.

Information is lacking as to what machinery will be set up by federal authorities to enforce the ban ordered on interstate traffic of illegal oil. The Texas Railroad Commission and its enforcement staff on duty in the field lack the ability and respect of the veteran violators to attain the results desired. Opinion prevails generally that the federal government will be forced to take a direct hand in seeing that the President's order is observed, and possibly example cases made through convictions at an early date.

Small Number Violators

Ability and desire to evade proration restrictions is a deeply imbedded practice with a small percentage of the 1100 producing units and about 100 separate pipe line, car rack, tank truck and local refining units engaged in buying oil in the field. Issuance of a ban by the President has already served as an adequate warning for some violators to cease their activities, but there are others who will carry on under cover until criminal charges are pressed. A hard blow for the nationwide success of the National Industrial Recovery Act will be dealt unless rigid enforcement is given the President's order as it affects illicit oil movement from East Texas, which is the only flagrant violator of the commission's proration rules in Texas.

First hand information as to the sources of illegal oil production in East Texas is in the possession of the United States Internal Revenue and Intellegence departments through their activities in ferreting out violators of the federal gasoline and crude pipe line tax levies. These special taxes have been in effect since June 21, 1932, and an enforcement staff has been on continuous duty in the field since the first of the present year. It is reported that a number of instances involving complete omission and fraudulent returns have been uncovered by these field agents among independent pipe line companies and refineries, but prosecution has been held up as a larger list is in prospect when first indictments are requested of a federal grand jury.

Auditing of records required of pipe line companies and refiners as part of the 1932 revenue act, has revealed to the agent vast quantities of over-production, but such information is not available to state authorities. Refiners and pipe line companies are credited with having maintained two sets of books in several instances, with the correct figures being made available only to the federal agents.

A ban on illegally produced oil that is refined and sold for consumption within the borders of the state is not covered by the President's order, thereby allowing an opening for a limited volume of oil to be produced until the commission can strengthen its enforcement. The 45 operating refineries within and adjacent to the East Texas field are supplying about 10,000,000 gallons of gasoline monthly to consumers within the state, and the bulk of this is transported in tank trucks. The balance of their output is reaching interior markets in all sections east of the Rocky Mountains between the Canadian border and the Gulf of Mexico, while a sizeable portion goes via tankers to the Atlantic Seaboard.

Fear Price Upset

Law abiding refining and marketing units in Texas foresee danger of a highly competitive and price-cutting condition arising through refineries having access to illegally produced oil that is immune from the federal ban electing to dump same on local markets, then consign refined products made from oil produced in conformity with state laws to interstate outlets. This is one of the many perplexing situations certain to arise, and there would be danger of the practice spreading since the selling price on hot oil would be lower than heretofore. It is believed that all major companies, many of whom have been guilty of transporting and buying directly or indirectly crude oil known to have been produced contrary to laws of the state, will cease such activities due to their wholesome respect for President Roosevelt's edict.

Prompt action has been taken by some majors to comply with the new restrictions on hot oil traffic by demanding that a

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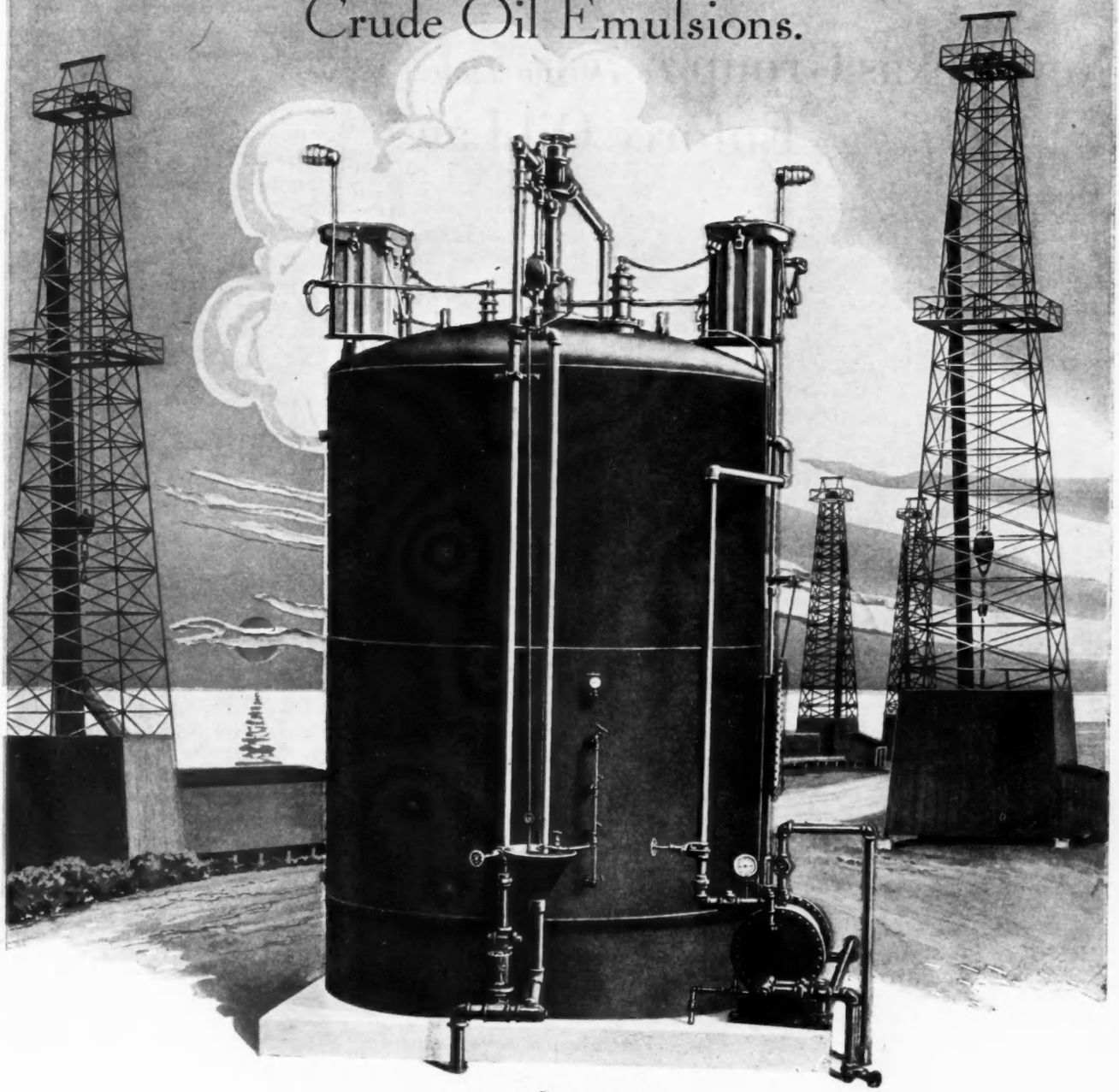

PETRECO

The Electrical Process for Dehydrating Crude Oil Emulsions

PETROLEUM RECTIFYING COMPANY OF CALIFORNIA
Security Title Insurance Building., Los Angeles. Branch: Houston, Texas

sworn to affidavit be given by independent refiners in East Texas that gasoline purchased from the latter is derived from crude produced in accordance with proration rules of the state. Major companies frequently make purchases of gasoline, especially the third grade product, from independent refiners within the state. The affidavit requirement will be the protection of the purchaser.

Heretofore, affidavits signed by producers and gatherers of crude in the East Texas field in compliance with orders of the commission have been found to be false in great numbers where illicit crude is involved. Fake names have frequently been affixed to affidavits. Unless this practice is broken up the railroads and pipe line carriers may continue to handle large quantities of illegally produced oil for interstate movement although the latter are supposedly complying with the law.

New Texas Group *To Devote Time To Helping* Enforce Oil Laws

Houston.—Directors of the Texas Petroleum Council* will consider a plan for throwing the weight of the organization to the aid of the federal government in enforcing the executive order of President Roosevelt to the effect that the interstate shipment of oil produced in violation of a conservation order is illegal. The plan was devised by George A. Hill, Jr., president of Houston Oil Company of Texas and will be put before directors in Austin July 17.

The suggested plan was recommended for East Texas. Its application, however, could be applied to any oil producing territory regardless of size of importance. It involves formation of an East Texas Regional Committee of the East Texas Petroleum Council.

The organization would consist of a regional chairman, 10 vice chairmen, a secretary and a treasurer. Each vice chairman would in turn have supervision over a section. The sections suggested are: loading rack statistics, pipe line statistics, royalty owners, legal counsel, production statistics, anti pollution, transportation statistics, press counsel, storage statistics and refinery statistics.

Each of these sections would have a vice chairman, an assistant vice chairman and an assistant secretary, as well as a membership selected from among the East Texas producers and oil field employes.

Mr. Hill prepared the skeleton of the organization upon learning that the President had signed the order, and mailed a copy to each director of the organization. The fact that the law which gives the President authority to issue such an order provides no special machinery for its enforcement prompted this move. In explaining this Mr. Hill wrote:

"United States district attorneys are the law enforcement officers charged with the duty of prosecuting violations of the foregoing executive order of the President and the United States district courts have exclusive jurisdiction in such cases.

"The federal government, however, at this time, has no effective machinery for the investigation and collection of the information upon which to base complaints for the violation of such executive order, and the executive order of the President will be ineffective unless the machinery for the investigation and reporting on such matters is supplied within the industry itself by those having detailed knowledge of the facts, effectively organized for the purpose of investigating, collecting and disseminating such facts in a way that will guarantee their authenticity."

After showing how oil produced in the field finds its way to market, he continued:

"Who are better qualified than the field superintendents of production, pipe line superintendents, superintendents in charge of tank farms, men in charge of loading racks and refinery superintendents, organized into effective working groups to investigate, collect and disseminate this information and to supply the same to the federal agents charged with the duty of investigating and reporting such matters to the United States district attorneys?"

Copies of the plan of organization and purposes of the regional committee were dispatched to federal officials as well as Senators Sheppard and Connally. That the department of justice will give some assistance is anticipated. Mr. Hill cited the value of this as:

"The federal government could well afford, through the Department of Justice, to immediately designate its own paid representatives to cooperate with this association in the investigation and collection of this information, and if need be, deputize certain people affiliated with the East Texas regional committee of the Texas Petroleum Council to engage in such investigation work either upon a paid or uncompensated basis."

Texas Commission Calls Statewide Proration *Hearing* For July 27

Austin, Texas.—The Texas Railroad Commission has announced a statewide hearing at Austin, July 27, to consider revision of proration orders effective in all oil fields of the state.

Orders on 23 fields expire by their own terms on August 1, and the commission determined to hold the hearing in advance. One plan had been contemplated whereby hearings on fields with settled production would not be held, but the present orders extended. Members of the Attorney General's department, however, expressed the opinion that such an action might result in invalid orders.

The notice of hearing did not carry a request for nominations from purchasers. This is the first time since the market demand law became effective that the commission has not made this request.

This was considered an indication that the commission has abandoned any effort to curtail production to the market demand, especially in the flush areas where the potential is far above the demand. Recent orders, however, indicate that market demand is to be given due consideration in increasing allowables to some extent—but not to the extent of allowing unreasonable physical waste.

Following this hearing on July 27, the commission has scheduled three other hearings of importance to oil operators on July 31.

1. The hearing to fix pipe line rates for all common carrier lines and gathering systems.

2. A hearing to determine how much oil shall be allowed in storage within the state.

3. A hearing on rates and regulations to govern the "common storer" activities of Humble Pipe Line Company. (Postponed from October 26, 1932.)

Probably the most important of the hearings set for July 31, is that to determine fair charges for common carriers.

Three more or less abortive hearings have been held, the last one being postponed largely because of lack of evidence.

Members of the commission have expressed the hope that a general rate reduction following the precedent already

(Continued on page 16)

*See organization report on page 18.

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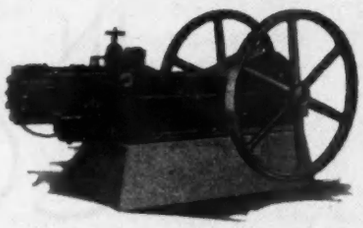

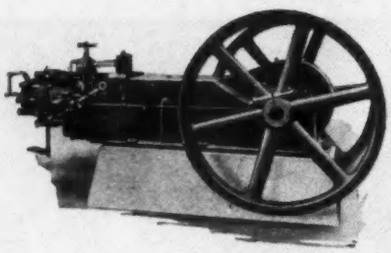

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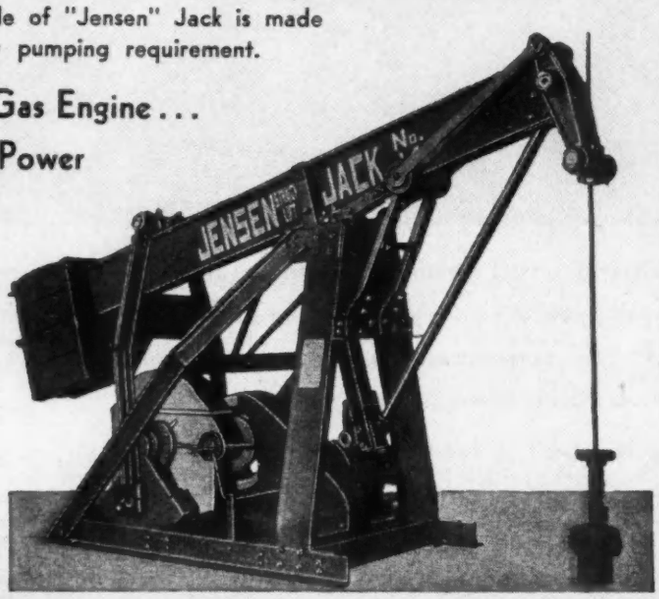

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MEN IN THE INDUSTRY'S NEWS

JACK VIETS, scout and land man for Sun Oil Company in North Texas with headquarters at Wichita Falls, has been transferred to Beeville to scout a portion of Southwest Texas, where the company has recently acquired large lease holdings. Viets had scouted in North Texas for the past eight years and his transfer marks the complete withdrawal of the company from the district.

ROBERT S. ELLISON, president of Stanolind Crude Oil Purchasing Company and Stanolind Pipe Line Company, has returned to Tulsa after a visit which included stops at Casper, Denver, and Colorado Springs.

J. R. PHILLIPS, president of Skiatex Petroleum Corporation, Borger, Texas, was a recent visitor in Tulsa and Skiatook. Phillips reports that much damage has been done in his area by the long spell of dry weather.

W. G. HELTZEL, general superintendent of Stanolind Pipe Line Company, left Tulsa during the week for a 10-day trip to eastern points.

H. F. BRINDEL, Gypsy Oil Company, has been re-elected chairman of the Mid-Continent Section of the American Society of Mechanical Engineers for the year commencing July 1. Other members of the executive committee are: C. K. Bullen, vice chairman, Stillwater; W. H. Stueve, Oklahoma vice chairman, Oklahoma Gas & Electric Company, Oklahoma City; J. M. McGregor, secretary, Macadam Engineering Company, Tulsa; H. W. Manley, treasurer, Barnsdall Oil Corporation; R. H. Teed, Arkansas vice chairman, Hot Springs; F. R. McGrew, Louisiana vice chairman, Shreveport; W. G. Heltzel, ex-officio, Stanolind Pipe Line Company; and Harold Adkison, Mid-Continent division secretary. First meeting of the new committee was held July 11.

RUSH M. BLODGET, general manager of Oil Producers Sales Agency of California, has returned to Los Angeles after an extended Mid-Continent trip.

GLEN M. RUBY, president of Nordon Oil Company, has been absent from the Los Angeles office for some time while supervising operations in southern Alberta.

JACK LEWIS, scout for Barnsdall Oil Company of California, has been spending his vacation in Lower California, Mexico.

ROBERT P. BASCOM

R. P. BASCOM, who has been vice president and general manager of Shell Pipe Line Corporation, has been elected a general vice president of Shell Petroleum Corporation. He will continue in active charge of pipe line affairs and will have executive duties with regard to the company's crude oil purchasing and public relations activities.

J. W. Watson, comptroller, has been elected treasurer and comptroller. He will have charge of the work of the secretary and assistant treasurer, assistant comptroller, personnel and stores.

CLIFFORD COOPER has been confirmed state oil proration umpire for Kansas by the Kansas Corporation Commission. Cooper has been assistant under Lloyd R. Pickrell, who resigned effective July 1 to enter the oil business as an independent operator.

ARTHUR I. DAVIS and Frank Henry, consulting geologists of Los Angeles, and Ben F. Hake, geologist for Nordon Oil Company, are doing special work in southern Alberta for the Nordon interests. The company is drilling a well a short distance north of the Montana line and about 50 miles west of Milk River.

JOSEPH JENSEN, chief petroleum engineer for Associated Oil Company, has returned to Los Angeles from Washington, D. C., where he went as a member of a special committee which was appointed to discuss unitization of the Middle Dome at Kettleman Hills. Floyd Bryant, Standard Oil Company of California, was also a member of the committee which talked with the secretary of the interior.

W. E. RAMSEY, Ramsey Petroleum Corporation, has returned to Oklahoma City after a trip to Utah where the company is resuming work on a wildcat test in Emery County.

JOHN H. LANGSTON, chief scout for Sun Oil Company, has returned to headquarters at Dallas after spending a vacation in seeing the high spots at Chicago's Century of Progress Fair.

OMER K. BENEDICT, vice president of First National Bank of Tulsa and pioneer Oklahoman, died July 11, as the result of a heart ailment from which he had suffered for the past two years. Mr. Benedict leaves a record which includes noteworthy accomplishments in civic service. Born in Gilman, Iowa, December 19, 1875, he moved to Harper County, Kansas with his parents in 1878.

S. F. SHAW has returned to San Antonio from East Texas where he was investigating conditions in connection with installation of gas-lift intermittent flow.

DR. DONALD C. BARTON, consulting geologist of Houston, recently presented before the Dallas Petroleum Geologists a paper titled "The Alignment of Gulf Coastal Salt Domes."

JOHN E. SHATFORD, president of Ouachita Valley Refining Company, Eldorado, Arkansas, was elected president of the Louisiana-Arkansas Refiners Association at a special meeting here June 28, to fill the un-expired term of C. M. Lamson, resigned.

Other officers elected were: Horace Canon, vice president of Root Refining Company, first vice president; and J. A. Welch, general sales manager of Louisiana Oil Refining Corporation, second vice president. D. W. Harris, vice president of Louisiana Oil Refining Corporation, was elected to replace Lamson on the board of directors. Ben H. Gray, vice president of Spartan Refining Company, was elected to fill the vacancy on the finance and budget committee, caused by Lamson's resignation.

FLOYD WARTERFIELD, engineer for Oklahoma Pipe Line Company, is expected to return to Tulsa about July 17 from a business trip to Texas.

Wages and Labor *Provided for in Code* ... Hearing Set for July 24

WASHINGTON, D. C., JULY 13.

AN average working week of 40 hours for employes of the petroleum industry, with wage minimum scales ranging from $16 to $18.80 per week, is provided for in supplemental provisions to the oil industry's code of Fair Competition filed today with the National Recovery administration. With submission of hour and wage provisions, omitted from the code as originally drafted, the document is now completed and hearings will be held July 24.

The supplement submitted to General Hugh S. Johnson today, provides that:

"The employes of the petroleum industry, except executives and their immediate clerical forces, and pumpers on stripper wells, and others on isolated properties, will work an average of not more than 40 hours per week. Because of the exigencies of the oil industry if may be necessary to work employes more than 40 hours per week on occasion, but the weekly work for each individual for each six months' calendar period shall not exceed an average of 40 hours per week."

To meet the differences in cost of living in the various sections of the country, the code adopts the geographic divisions used by the Bureau of Labor Statistics, and provides a minimum hourly rate for adult male employes of 40 cents per hour in the South Atlantic, East South Central and West South Central States, embracing Delaware, Maryland, Virginia, West Virginia, North and South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma and Texas; 42 cents in the West North Central States of Minnesota, Iowa, Missouri, North and South Dakota, Nebraska and Kansas, and 45 cents in the Mountain States of Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Nevada and Utah. The top scale of 47 cents an hour will be paid in the other areas, including the New England States, New York, New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Michigan, Wisconsin, Washington, Oregon and California.

At the rate of 40 cents an hour, oil workers will average $16 per week; at 42 cents they will average $16.80; at 45 cents, $18, and at 47 cents, 18.80.

"The rates for skilled labor bear a fair relation to the foregoing, giving due consideration to the experience and skill of the employes affected and to the prevailing scale for similar work in the locality of the employment, but no attempt shall be made to introduce any classification according to the nature of the work involved which might tend to set a maximum as well as a minimum wage," the supplemental code continued.

"In order that the President of the United States may be informed as to the observance or non-observance of this code and as to whether the petroleum industry is taking appropriate steps to effectuate the declared policy of the Industrial Recovery act, each person engaged in any phase of the petroleum industry will furnish duly certified reports every six months showing the actual hours worked by the various occupational groups of employes and the minimum weekly rates of wages in such form as may be hereafter provided."

Indications that the 40-hour week at 40 to 47 cents per hour will be the subject of controversy when hearings are held were seen in a telegram sent the independent associations today by John B. Elliott of Los Angeles, chairman of the committee for the independent oil producers and refiners of the United States, urging them immediately to limit hours of labor and fix a minimum wage without the formality of preparing codes.

The committee's recommendation, however, provides for a six-hour day and a maximum of 36 hours a week at a minimum wage scale of not less than 50 cents an hour, which would be an average of $18 per week in those areas paying the lowest hourly wage, or about two dollars more for four hours less work than is proposed in the main code.

This recommendation will be submitted during the hearings, together with recommendations that all importations of oil and its products be prohibited where such importations come into competition with American labor, and strict limitation on withdrawals from storage where they would effect employment.

"The administration will have no difficulty whatever in securing the full support and cooperation, in its program for decreasing unemployment, from the independents in the oil industry of the United States," Elliott said, in announcing his program. "They are in hearty accord with the effort to improve the status of labor and will strive energetically to better conditions of the oil industry, with particular reference to maintaining the standards of fair competition and the protection of the rights and interests of the consumer."

Texas Commission Calls Statewide Proration Hearing for July 27
(*Continued from page 12*)

established will occur before the hearing takes place.

Announcement of a hearing to limit storage in Texas occured at the same time the commission wired President Roosevelt asking his assistance in the control of shipments of oil in interstate and foreign commerce.

The exact method to be persued in arriving at a proper figure is still vague.

It was pointed out that should it be demonstrated that there is now too much oil in storage in the state, production would have to be curtailed to a point that would allow reasonable withdrawals from storage. This might bring the commission into another series of court suits from operators who have no oil stored, but who have producing wells and are anxious to take advantage of rising prices to dispose of their production.

The order specifically stated that the commission would inquire into "waste" resulting from storage.

The case of Humble Pipe Line Company as a "common storer" of oil may involve difficulties. The commission seeks to establish rates, rules and regulations to govern these operations. The notice of hearing sets out a series of "proposed" rules to handle this situation. The rules include a charge of two cents per barrel per month for oil held in storage.

The company is given a lien on the oil stored to insure payment of storage charges, and may dispose of production so held at the end of 90 days, if the charges remain unpaid.

They are allowed to deduct one-fourth of one per cent per month for loss through evaporation. A charge of 2½ cents per barrel is allowed for delivering oil from the storage tanks to loading racks and tank cars.

Darling Forged Steel Gate Valve, Dar-a-loy trimmed for drilling, well control, flow lines and other hazardous conditions.

Keep the Oil After You Get It

It's one thing to coax the oil out of the stubborn ground and it's another thing to keep it once it is in your grasp.

Place Darling Forged Steel Valves at the vital points—where control of high pressures means the saving of thousands of barrels of oil. True enough you invest a trifle more for this extra strength, but it pays—pays big!

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Texas Petroleum Council Formed at Meeting in Houston

DIRECTORS of the Texas Petroleum Council in session at Austin Monday will consider the election of a president since Judge Robert W. Stayton of the University of Texas law faculty found it impossible to accept the position. He was tendered the position at the organization meeting in Houston July 10. Press of other duties which could not be abandoned caused him to decide against the post.

One of the men to be offered the position is A. W. Walker, Jr., also a member of the faculty of the Texas University law school. He teaches oil and gas law.

The organization meeting in Houston resulted in the election of a board of directors as well as many statements of possible activities of the organization.

Federal Co-Ordination

Mr. Hill, who presided as temporary chairman until the directors had elected Captain J. F. Lucey, and who had expressed in a letter calling the meeting that he would accept no office in the organization, declared, "The whole idea behind this association is premised on the fact that honesty is the best policy. There is no axe to grind,—except law enforcement."

In elaboration of a suggestion made by J. S. Cullinan about synchronization with the federal government's actions, Mr. Hill explained that if the government accepts the set-up of the code committee formulated at Chicago, then the Texas Petroleum Council will work through that committee and make recommendations thereto.

"I have outlined to the committee of 52 how co-ordination between states and the federal government might be brought about," he said. "It is expressed in the Producers Code that 'the National Emergency Committee is to seek the aid of responsible associations throughout the country'."

Drawing the line between federal and state jurisdiction over oil, he explained that in his opinion, "Until oil is in the flow tanks, it is under state jurisdiction. When it enters the lines of commerce, it is under federal jurisdiction."

Major Parten

Major Jules A. Parten contributed one of the high points of the meeting with an address in the afternoon when he opened with:

"Whether we like it or not, we've got proration.

"But the trouble is that there is proration for some of us, but not for all of us.

"The 'hot oil' movement out of East Texas is the greatest problem in the oil business today," Major Parten continued.

"The trouble has been in the unproven effectiveness and legality of the commission's orders. Counsel for the violators advise their clients the orders are invalid. So the clients go ahead with violation, feeling immunity to punishment.

"Those of us who have obeyed proration, and suffered thereby, have stood about all we can stand."

Colonel Ernest O. Thompson and C. V. Terrell of the railroad commission occupied seats at the speakers table during the meeting. Both made talks.

Organization

George Sears gave the report of the organization committee. Roughly he proposed the directors shall consist of 60 members to represent a cross section of the industry; that the organization shall function through the president and five vice presidents — administrative, legal, technical, financial, and publicity; that regional groups be organized to work under the executive committee; that the central office should be located in Austin.

A. W. WALKER, JR.
Considered for President of the Texas Petroleum Council

Contingent upon his acceptance, W. E. Wrather, consulting geologist of Dallas, probably will occupy the position of executive first vice president. Mr. Wrather, who is a former president of the American Association of Petroleum Geologists, was nominated by Perry Scranton of Houston.

Board of Directors

Elected directors of the Texas Petroleum Council, part of whom form also the central committee, include the following:

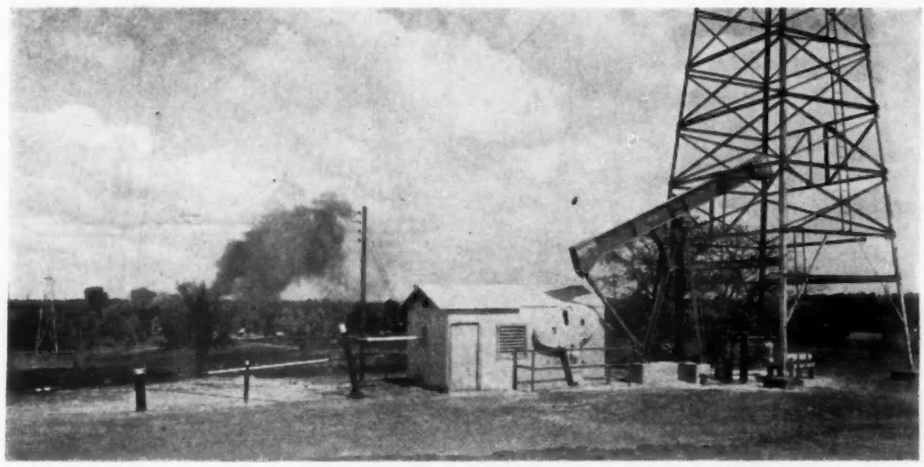
George Heyer, T. E. Swigert, Jack Pew, John R. Suman, Fred Sealey, J. S. Cullinan, Frank Prior, Joe Russell, Hiram King, W. M. Irish III., Ed T. Moore, J. F. Lucey, Freeman Burford, H. L. Hunt, John Kilgore, R. R. Hobson, C. F. Roeser, J. R. Parten, Tom Cranfill, M. W. Blair, Myron Blalock, Mr. Sniffen, Edwin M. Jones, E. S. Heyser, George Sawtelle, J. S. Abercrombie, S. P. Farish, Ed Salrin, Bailey Hardy, George L. Noble, Jr., Frank Yount, Gus Taylor, Nathan Adams, B. E. SoRelle, Lloyd Wheelock, E. L. Smith, W. R. Morrison, Ed Landreth, Carl Estes, J. D. Sandifer, George Morgan, J. D. Collette, J. M. Crim, W. A. Moncrief, Mell Davis, Stanley Marsh, Barney Flynn, Claude Ashby, Mills Bennett, Jake Hamon, Al Guiberson, W. G. Williams, Houston Hart, W. R. Nicholson, Harry Pennington, J. S. Bridwell, R. O. Garrett, W. C. McKinney, J. K. Wadley.

The suggested legal committee is comprised of W. H. Francis, R. E. Hardwicke, George D. Sears, Beeman Strong, Marion Church, S. M. Leftwich, Thomas B. Ramey, John Kilgore, Myron G. Blalock, T. L. Foster, Rhodes Baker, Palmer Bradley, Elwood Fouts, Jacob F. Wolters, David Proctor, J. B. McIntyre, H. F. Montgomery, Dan Moody, W. A. Vinson, Tom Knight, Edgar Townes, Dillard Estes, Pat Swearingen, H. Hiner, Barney Braley, C. L. Black, Senator Tom Pollard, John Boyle, J. A. R. Moseley, Jr., Harris Melasky.

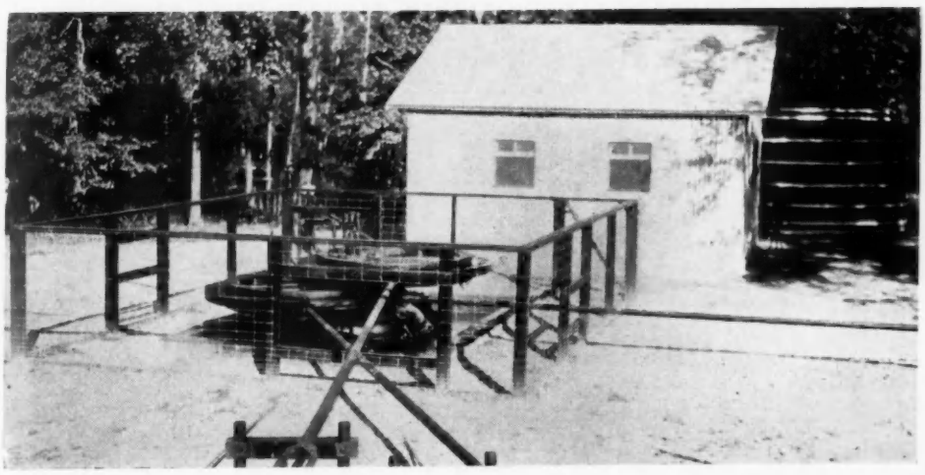
Houston.—Shell Petroleum Corporation has awarded contract to Spencer & Howe, Port Arthur, Texas, for construction of oil loading docks at Lake Charles, Louisiana. The material contract was let to National Creosoting Company, Houston. Dock will accommodate one large tanker, one small tanker and one barge. The company will barge crude oil from its Coastal Louisiana fields to the sea loading docks at Lake Charles for shipment to its refineries.

Typical East Texas Pumping Installations

WITH pumping already beyond the experimental stage in East Texas, operators in this area are concerning themselves more and more with the problems that confront them as reduced pressures force the more than 10,000 wells to resort to artificial means of producing. On the following pages an effort has been made to show typical pumping installations that have already been made in the field. These pictorial pages form the opening of a special section devoted to considerations of the various pumping problems in East Texas.



Sun Oil Company's Barker lease, equipped with a 5½-inch Lufkin herringbone unit, driven by a 30-horsepower General Electric motor. The unit is provided with a backside crank one-well take-off, stroke post, slide bar knock off and center line oil bath beam.

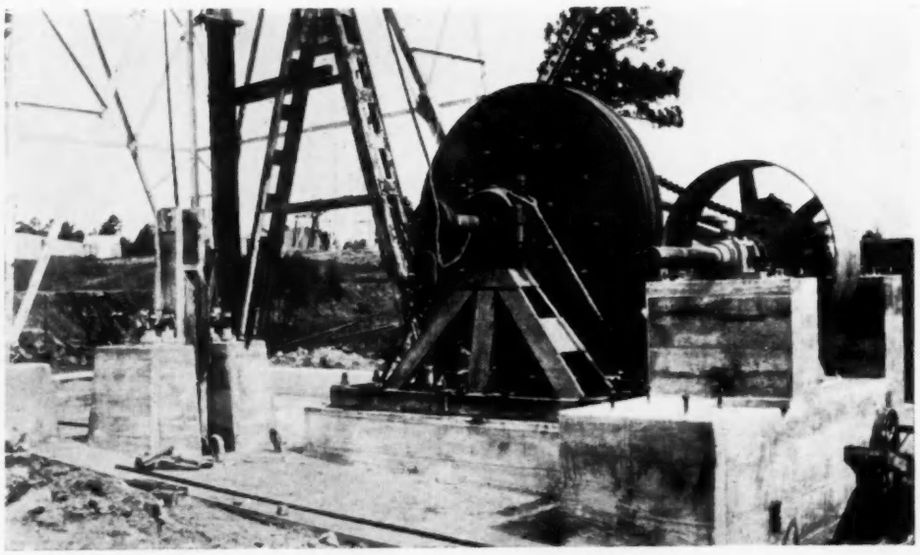


Sun Oil Company, Till lease, Rusk County, has installed an Oilwell Imperial Oilbath geared power with two eccentrics for pumping several wells.

Wheelock & Collins, Inc., Kilgore, well equipped with J. P. Ratigan combination crank and beam counterbalance type pumping unit, 20-horsepower electric motor driven.

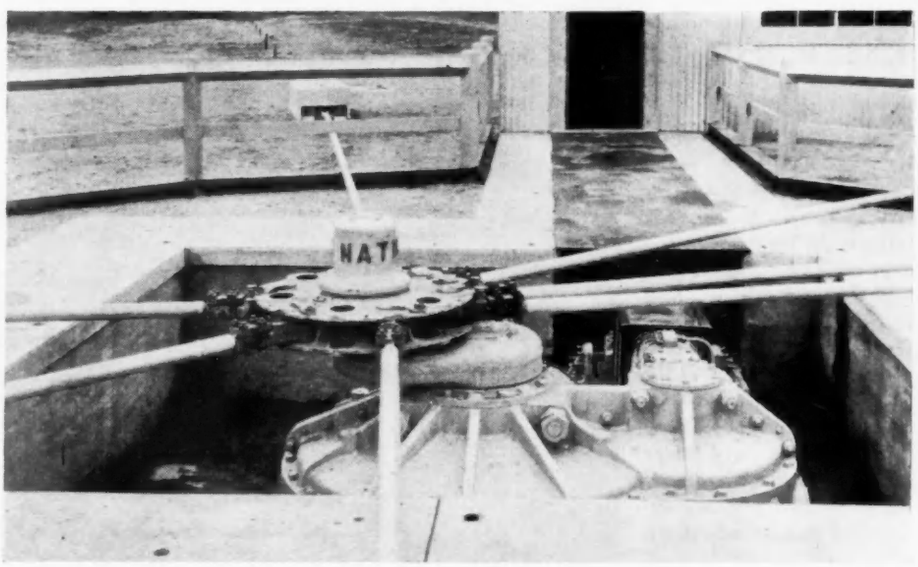
Kirby Petroleum Company's Jeff Reddic 2, equipped with Oilwell Twin Crank Unit Power with Pitman Equalizer, and with Westinghouse-Nuttal double reduction gear unit. Driven by motor mounted on the frame of the unit.

Sun Oil Company, Morton lease, equipped with 5½-inch Lufkin Worm Gear Unit driven by a Waukesha engine. The unit is equipped with a backside crank with two-well take-off.



Moss & Urshell, Rusk County, O.C.S. countershaft and chain-driven band wheel in course of construction, to be powered by gas engine. Note the pendulum type stroke post ahead of the backside crank for low rod line take-off to operate two wells.

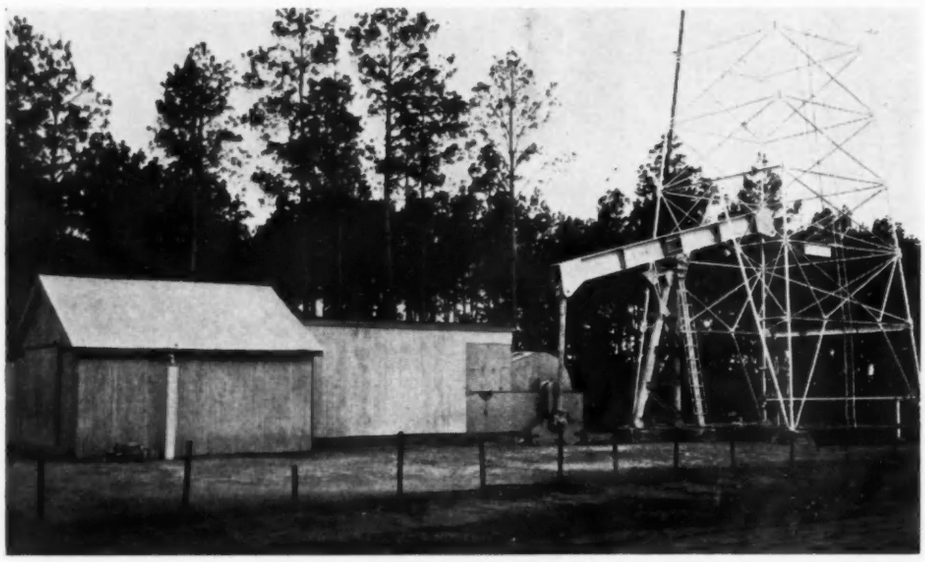
Tom Carter's Russell 1, Kilgore townsite, equipped with Uni-V Pumper, developed by Frost Electric Company. Drive is by 10-horsepower electric motor, through reduction gear actuating lower extremity of hanging steel "V."



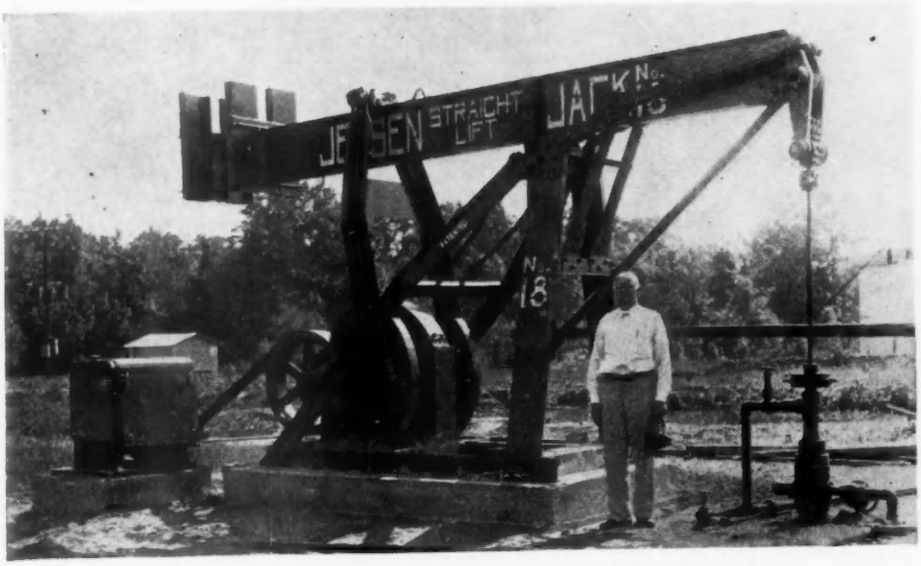
National Supply Company geared power with single throw 36-inch stroke crank which has been installed below ground on a concrete foundation at a level to allow for rod-line elevation of only eight inches. The power pumps seven wells on Mid-Kansas Oil & Gas Company's Price lease near Carlyle.

Sun Oil Company, Walker lease, well equipped with Lufkin 5½-inch herringbone unit, driven by 30-horsepower electric motor.

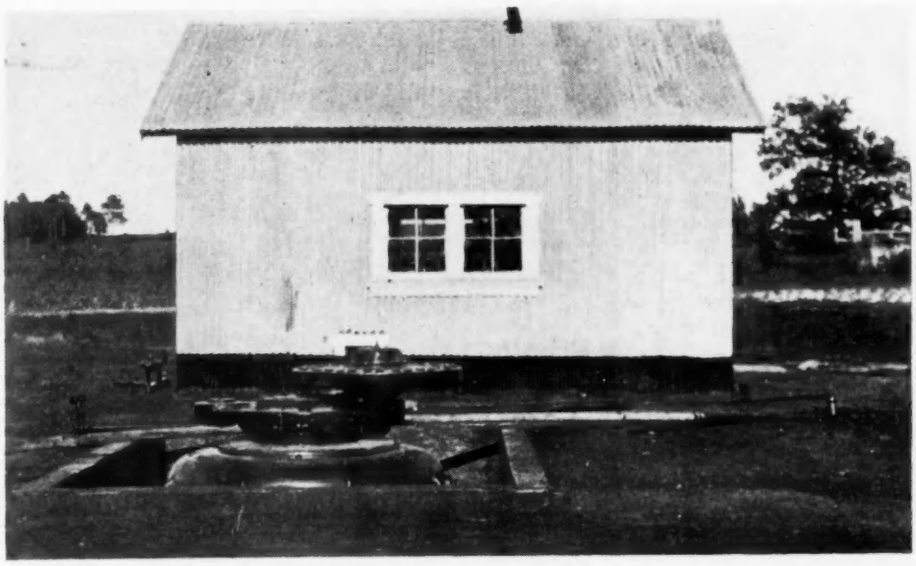
Mid-Kansas Oil & Gas Company, M. A. Price lease, near Carlyle townsite, pumps seven wells with a National geared power. The power is operated by a 100-horsepower Superior twin-cylinder two-cycle gas engine.



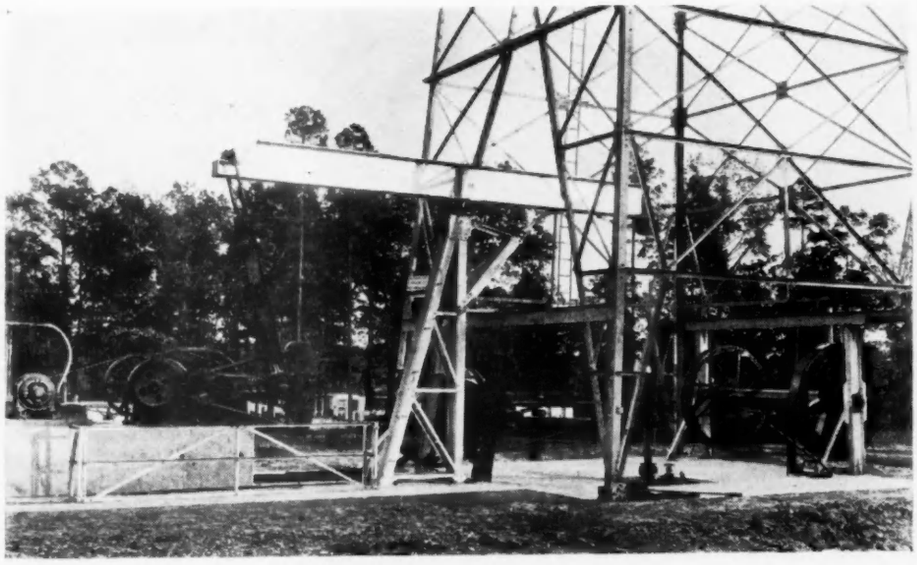
Mid-Kansas Oil & Gas Company, near Henderson, has installed an O.C.S. Heavy Universal Rig Front equipped to drive bull wheels, calf wheels and sand reels and the O.S.C. balance for balancing heavy wells. The installation is driven by a single cylinder Oil Country gas engine and drive from the engine to the rig front is by belt to the gearless reversible countershaft.



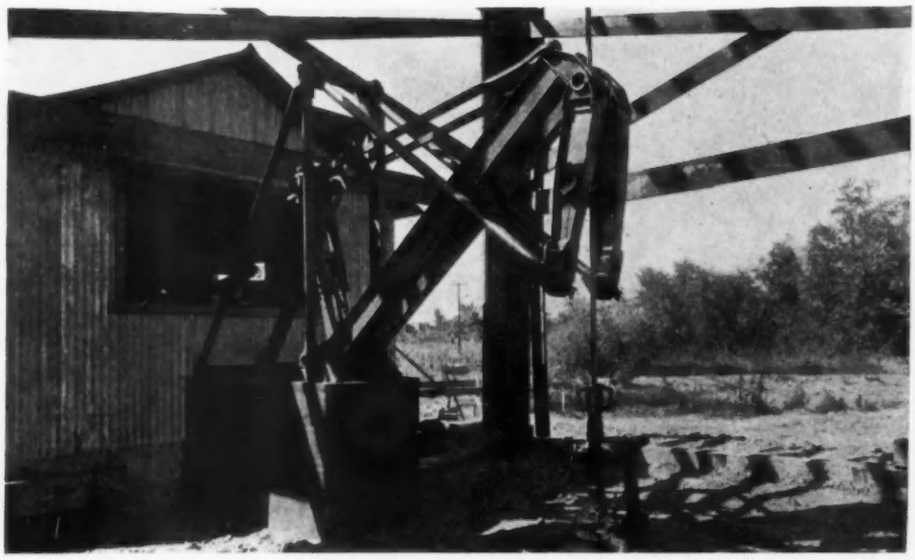
Fair & Thompson on their Tubbs lease, are using engine driven Jensen Brothers Manufacturing Company well pumping unit. These machines pump two wells on a double hook-up. Engine on separate foundation and belt drive to pumping unit.



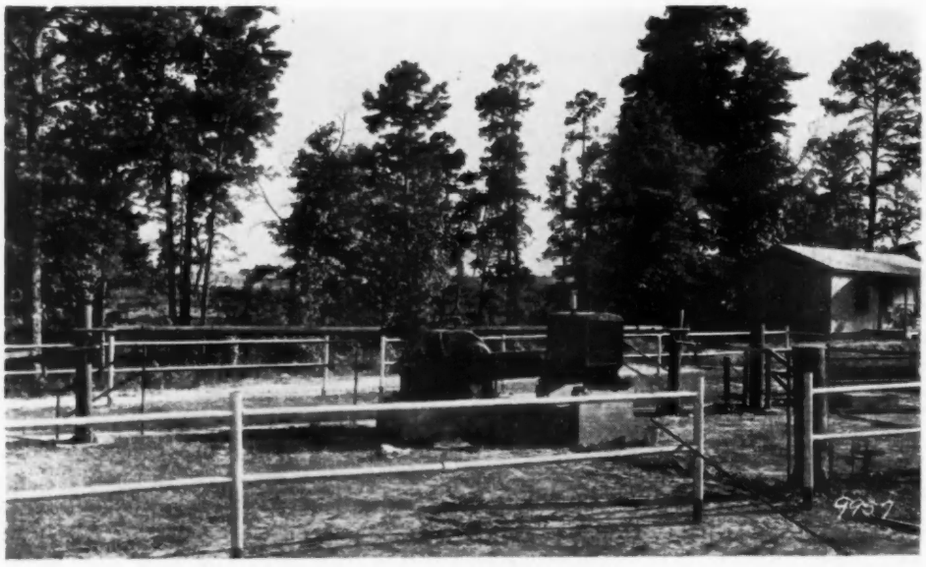
Sun Oil Company, Schuler lease, equipped with Oilwell Imperial Oilbath geared power with single (dual stroke) crank. Crank pin is placed in one hole for 30-inch stroke and in the other hole for 36-inch stroke. Gas engine driven.



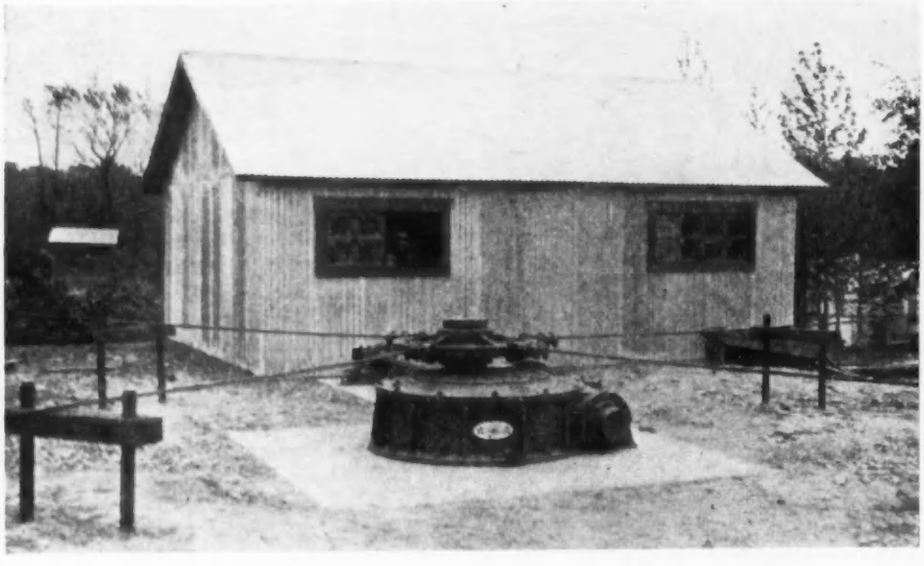
Superior Oil Company, L. C. Ingram 11, W. E. Pasteur Survey, equipped with Emsco-Falk Production Unit, using constant speed electric motor (Y-Delta, Internal Delta) with 40, 25, and 15 horsepower ratings. Motors drive the production units with brake, fly wheel and six-hole crank through a V-belt sheave on the unit which is allowed on a quick change quill or hub—a pumping speed of nine strokes per minute and a pulling speed of 30 RPM on the crankshaft.



Jenkins Brothers, Daisey Bradford 1, in the Joinerville area, is equipped with a Frick-Reid Master Pumping Unit, is driven by a single cylinder gas engine.

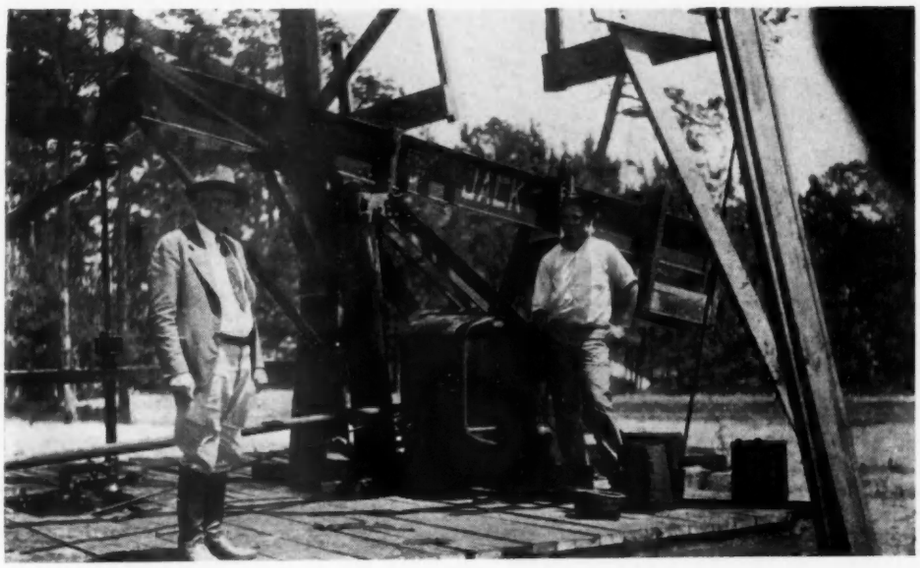


Steen Drilling Company's Phillips lease, Gladewater section, has installed an Emsco-Falk geared power unit, which is driven by a 35-horsepower Waukesha motor.



J. F. Merrick, on his Cooper lease, installed Lufkin Standard Worm Gear Central Power driven by a Single Cylinder Franklin Gas Engine, pumping four wells.

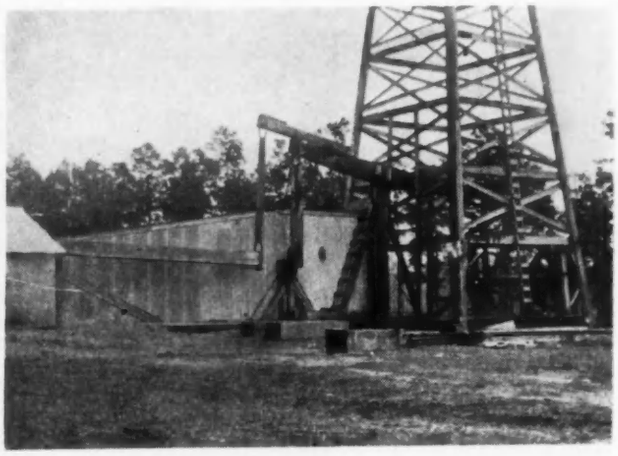
J. Collier Hurley's S. P. Hughey 1, Mary Van Winkle Survey, equipped with Oil-well Individual Pumping Unit. The machine is equipped with Westinghouse-Nuttal double reduction gear unit driven by V-belts with electric motor.



E. B. Roberts on his Alfred lease, near New London, uses a Jensen Brothers Manufacturing Company pumping unit, mounted on the derrick floor and engine driven. Machine handles two wells on a double hook-up.

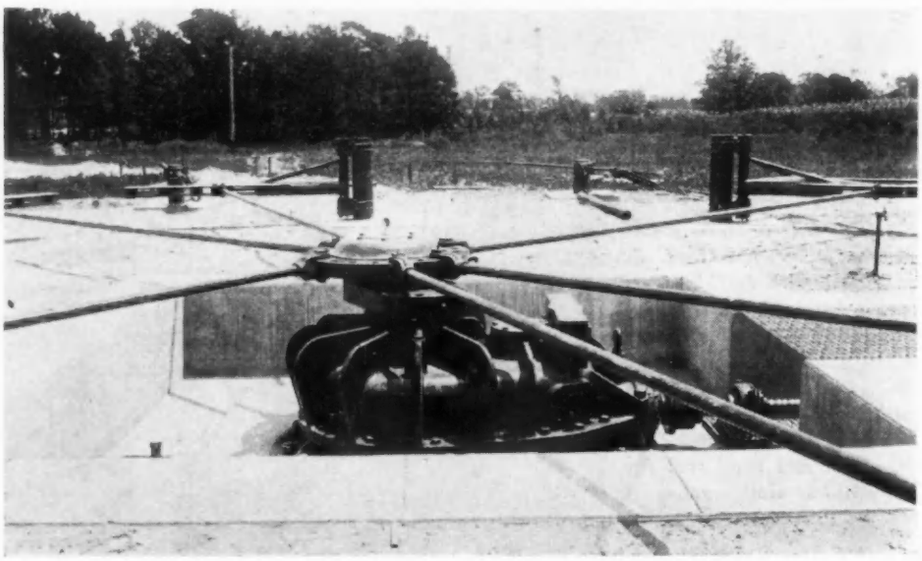
Sinclair Oil & Gas Company's Daisy Bradford 2, equipped with Lufkin 6½-inch herringbone unit, driven by General Electric 9-16-25 horsepower motor (Y-Delta, Internal Delta) with Westinghouse control. Provided with Rod and Tubing hoist and sand reel for complete well service.

Fair & Thompson on their Wylie lease, west of Henderson, have installed an Ideco pumping installation where the manufacturer has furnished rig complete with gas engine, geared unit, tubing hoist, A-frame samson post, all-welded walking-beam, swing post, roller bearing pitman, pitman oscillator and steel pumping derrick. (Photograph taken before construction of engine house).



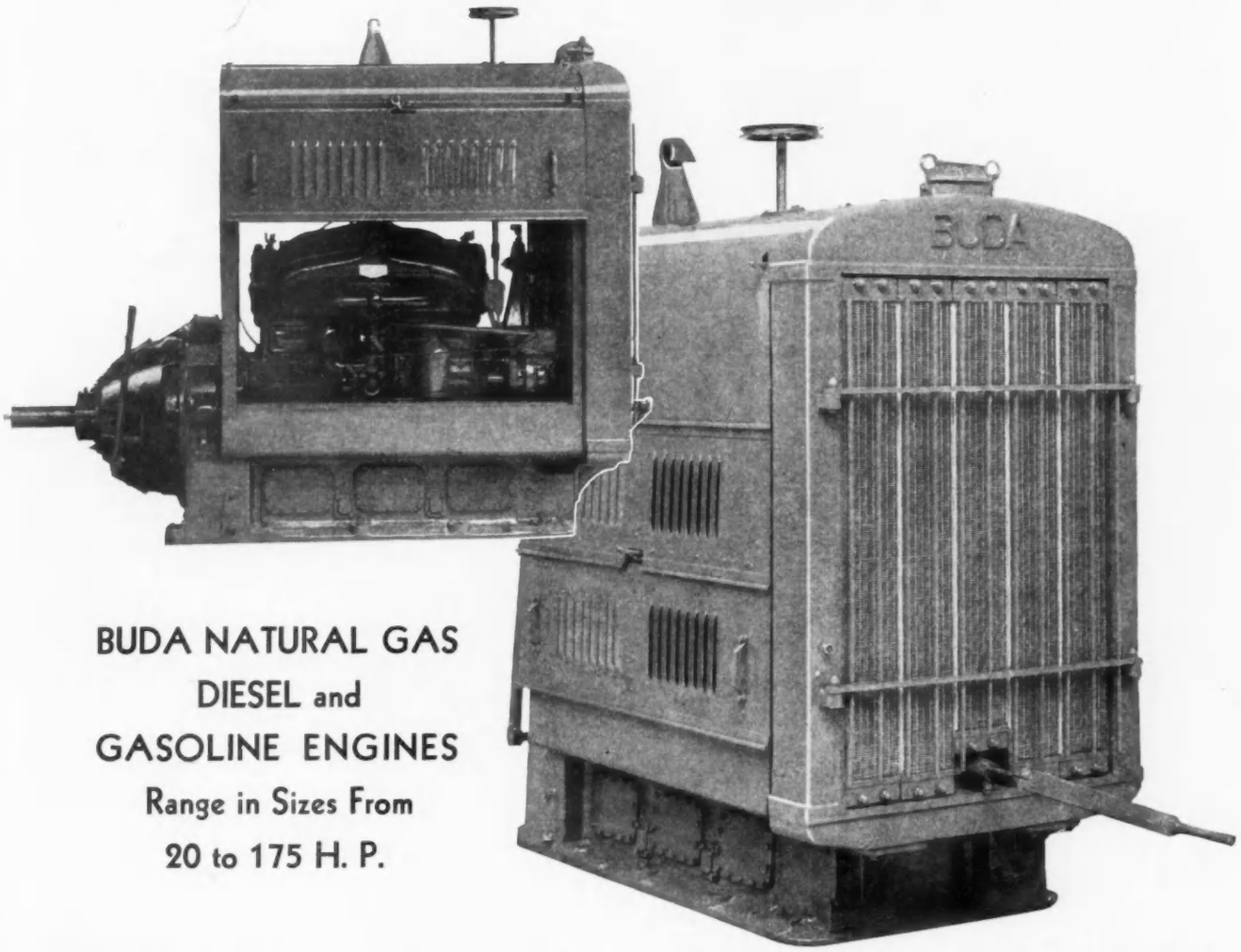
Typical wooden standard rig pumping East Texas well. Powered by Tico 35-horsepower two-cycle gas engine with reversible clutch. Bull wheels for servicing well. No countershaft.

Above—Tidewater Oil Company, at Kilgore. Well equipped with Lufkin Twin Crank Pumping unit, driven by electric motor.



Hunt Production Company, Wooley lease, equipped with Emsco-Falk Geared Power and Goehring Type Variable stroke and knock-off arrangement.

BUDA



BUDA NATURAL GAS
DIESEL and
GASOLINE ENGINES
Range in Sizes From
20 to 175 H. P.

More than eight years of experience in supplying multiple cylinder natural gas engines for oil field pumping service has enabled us to build into a Power Unit the essential features of dependability, long life, simplicity, and low cost of operation and maintenance.

One of the larger oil companies have over seventy-five (75) Buda engines in pumping service that are now over six (6) years old. During the sixth year they show a total maintenance cost of approximately $8.00 per month.

Our Engineers will be glad to work with you on your pumping problems or to supply detailed information to your Engineering Department.

THE BUDA COMPANY, Harvey (Suburb of Chicago) Illinois

DISTRIBUTORS:

The Jno. Muller Company—Houston and Ft. Worth
The Buda Engine Service of Tulsa—Tulsa
Production Equipment Co.—Los Angeles

THE economic importance of carefully selecting the proper pumping equipment in the East Texas Oil Field may best be presented by outlining the expenditures which are going to be necessary in equipping the 10,300 wells now in the field for the pumping stage. The cost of placing the wells on the pump will vary from a minimum of $1,500 to a maximum of $7,000; or an average cost of approximately $4,500 per well. An average cost of $4,500 per well for each of the 10,300 wells gives a total cost of $46,350,000.00 for pumping equipment. There probably will be 12,000 completed wells in the field. This number would bring the total pumping equipment cost to $54,000,000.00; most of which will be spent during the next 18 months.

A question which every operator, banker, and supply house is most vitally interested in at the present time is, "At what time will it be necessary to make these expenditures?"

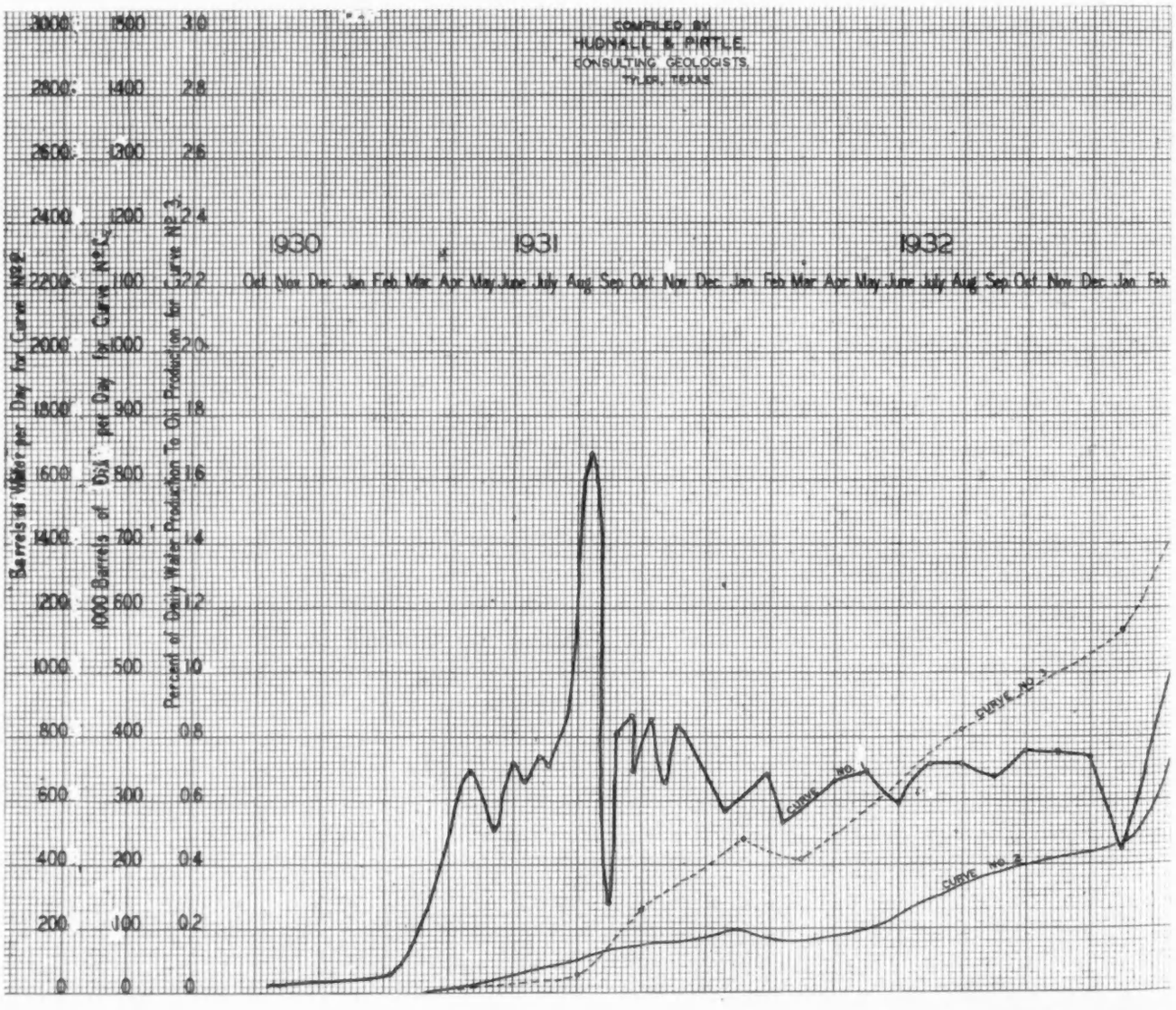
FUNDAMENTAL

The Selection Pumping

J. S. HUDNALL

IT is impossible for any engineer to calculate, mathematically, when an oil well, in the East Texas Oil Field, is going on the pump. A brief description of the factors affecting the time at which a well will go on the pump may throw considerable light on this subject. These factors are given below in the sequence of their importance:

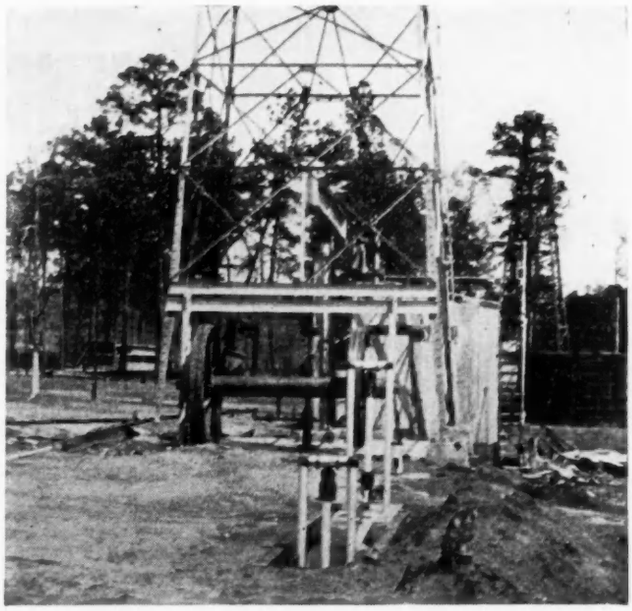
(a) Thickness of the saturated sand.
(b) Permeability of the sand.
(c) The bottom hole pressure of the area.


COMPILED BY
HUDNALL & PIRTLE,
CONSULTING GEOLOGISTS,
TYLER, TEXAS
1930
1931
1932
Oct Nov Dec Jan Feb Mar Apr May June July Aug Sep Oct Nov Dec Jan Feb Mar Apr May June July Aug Sep Oct Nov Dec Jan Feb
Barrels of Water per Day for Curve No. 2
1000 Barrels of Oil per Day for Curve No. 1
Percent of Daily Water Production To Oil Production for Curve No. 3
3000 1500 3.0
2800 1400 2.8
2600 1300 2.6
2400 1200 2.4
2200 1100 2.2
2000 1000 2.0
1800 900 1.8
1600 800 1.6
1400 700 1.4
1200 600 1.2
1000 500 1.0
800 400 0.8
600 300 0.6
400 200 0.4
200 100 0.2
0 0 0
CURVE NO. 2
CURVE NO. 1
CURVE NO. 3

CONSIDERATIONS IN

# of East Texas Equipment

HUDNALL & PIRTLE
Consulting Geologists, Tyler, Texas



(d) The distance the wells are from the influence of water.
(e) The depth of the wells.
(f) The amount and rate of withdrawals.

The thickness of the saturated sand is the most important of this group of factors for the reason that the chief force which causes the well to flow is the expansion of the gas associated with and absorbed in the oil. Hence, the thicker the saturated sand body, the greater the amount of oil and gas there is present to flow the well and the more prolonged will be the flowing life.

Permeability of the Sand

The second most important factor is the permeability of

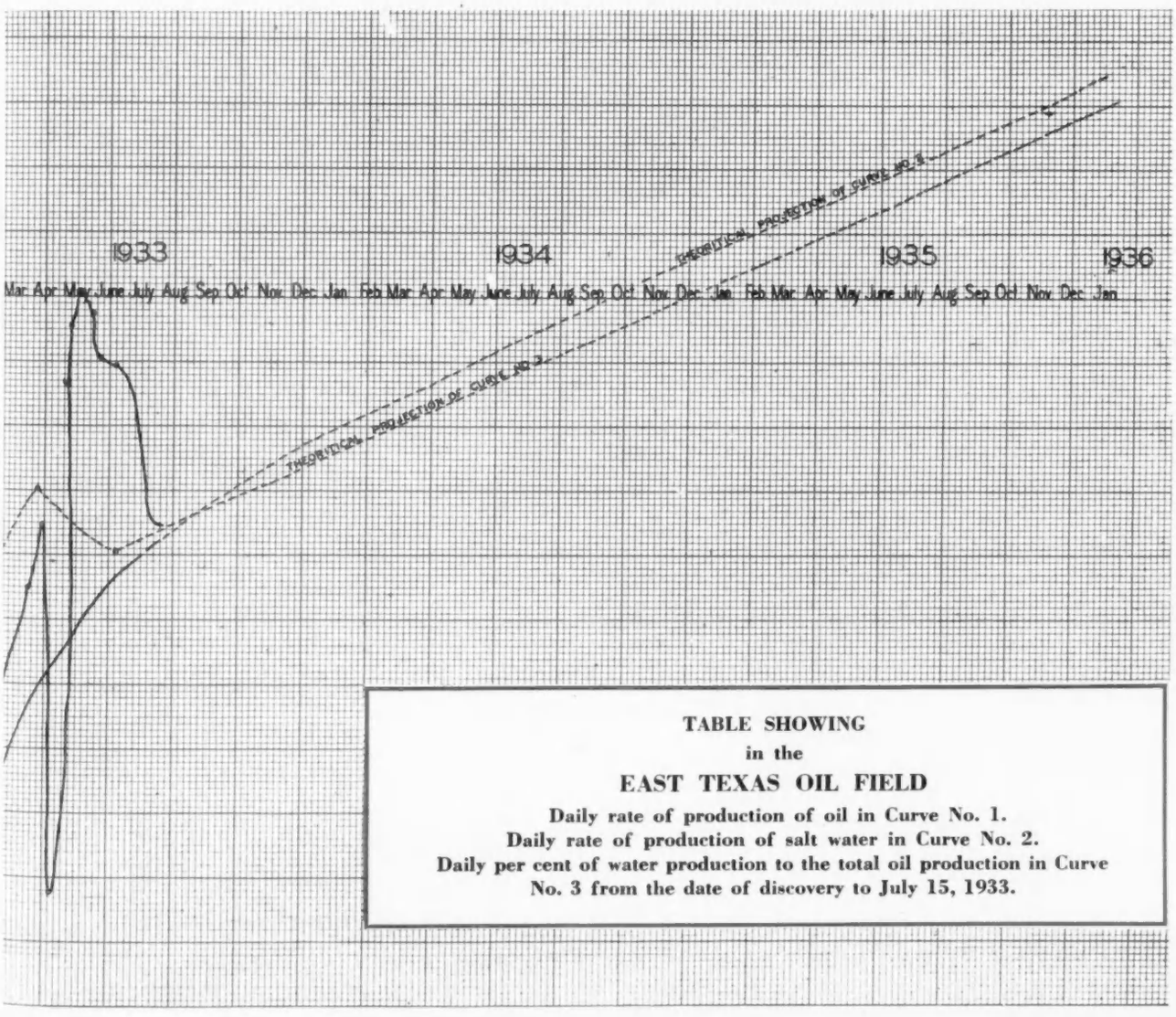

1933
1934
1935
1936
Mar Apr May June July Aug Sep Oct Nov Dec Jan Feb Mar Apr May June July Aug Sep Oct Nov Dec Jan Feb Mar Apr May June July Aug Sep Oct Nov Dec Jan
THEORETICAL PROJECTION OF CURVE NO. 3
THEORETICAL PROJECTION OF CURVE NO. 2

TABLE SHOWING
in the
EAST TEXAS OIL FIELD
Daily rate of production of oil in Curve No. 1.
Daily rate of production of salt water in Curve No. 2.
Daily per cent of water production to the total oil production in Curve No. 3 from the date of discovery to July 15, 1933.

UNITS WITH A BACK-

LUFKIN Central Powers

Lufkin Herringbone Central Pumping Powers

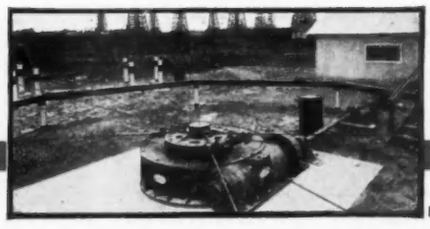
POWERS IN FOUR SIZES

Worm Gear

Herringbone Gear

Lufkin Worm Gear Central Pumping Powers

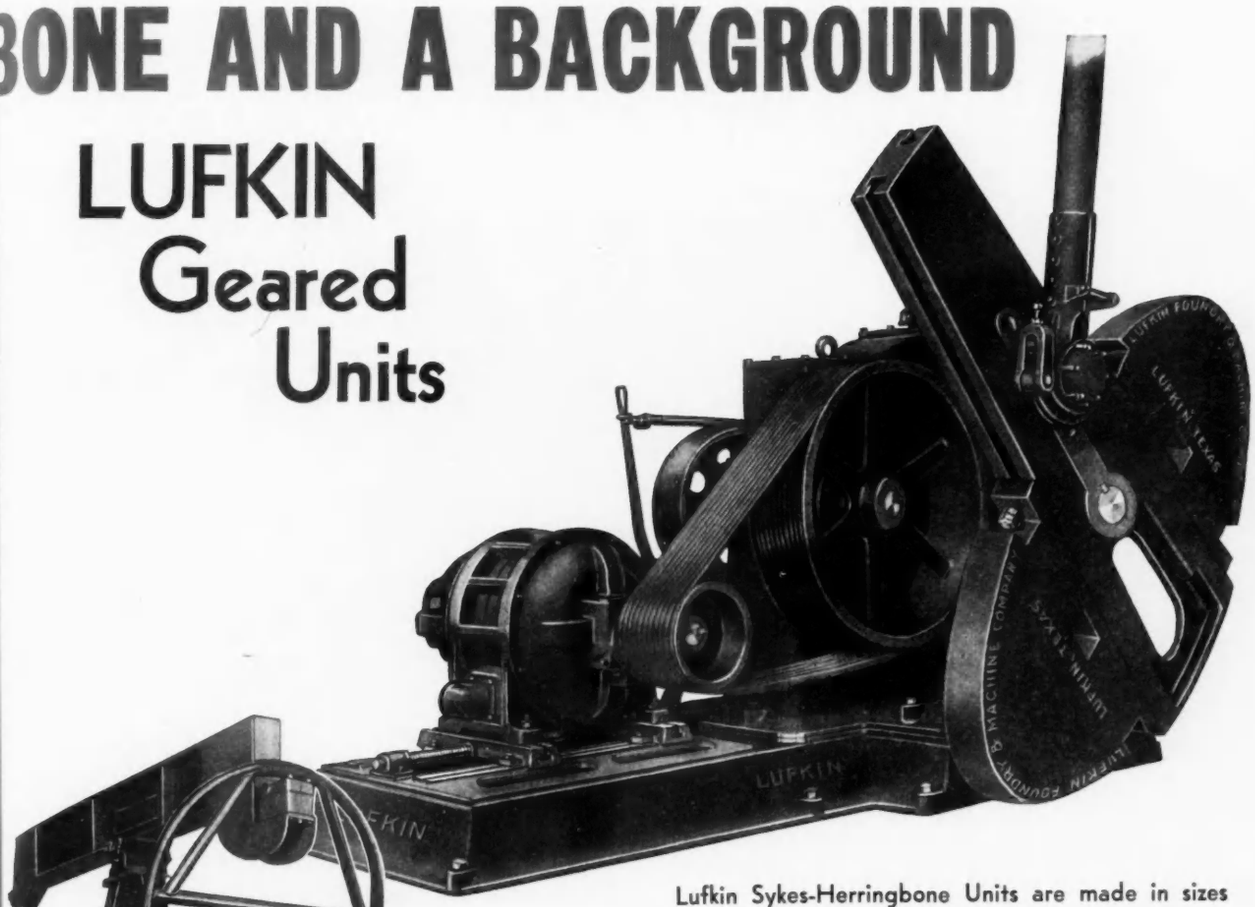
See Our Equipment in Composite Catalog Pages 125 to 148



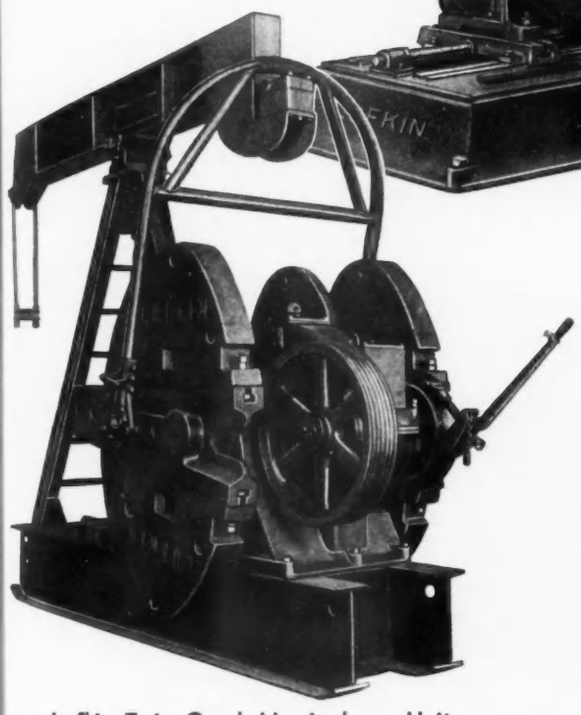
EAST TEXAS

BONE AND A BACKGROUND

LUFKIN Geared Units



Lufkin Sykes-Herringbone Units are made in sizes to suit all field and operating conditions

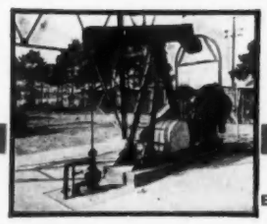


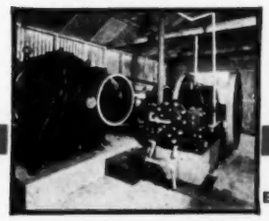
Lufkin Twin Crank Herringbone Unit Assembly

Two Hours
from Plant to Field
Lufkin Service
East Texas Office:
CRIM CREST HILL
HENDERSON, TEXAS
Lufkin Foundry & Machine Co.
Lufkin, Texas
DALLAS Magnolia Bldg. HOUSTON 2nd Nat. Bank TULSA Petroleum Bldg.

See Our Equipment in Composite Catalog Pages 125 to 148

EAST TEXAS


EAST TEXAS


EAST TEXAS

the sand. A combination of the permeability of the sand and the thickness of the sand probably represent 75 per cent of the controlling forces which determine when the well will go on the pump. The best measure of the combination of these two factors is found in the potential of the well. A study of the potential map of the East Texas Oil Field shows that the area of highest potential is near the center of the field in what is commonly called the "Fair Way." The axis of high potential shifted approximately 1,000 feet further west during the period between tests taken in the month of April, 1933, than those taken in the month of June, 1933, by the Texas Railroad Commission. The shifting of this axis to the west was due to the more rapid decline in pressure on the east side of the field. This axis is contemplated to continue to shift slightly to the west from time to time until it probably will ultimately reach a line between the 3260 and 3280 sub-sea structural contours on top of the Woodbine, and hence it may be said that the wells which will be the last to go on the pump will probably lie between the 3260 and 3280 subsea structural contours. The permeability of the sand is lowest in the south end of the field and along the extreme northwest edge of the field extending from a mile northwest of Gladewater through the north portion of the Hayden-Edwards, David Ferguson, G. W. Hooper, and Marshall Mann Surveys. The low permeability in these surveys is due primarily to the sand section containing a considerable volcanic ash which is exceedingly fine grain and is interbedded in the sand body carrying the oil. The small particles of volcanic ash fill the pore space between the sand grains to such an extent that oil cannot flow readily through the sand. Hence, the south end of the field which is commonly called the Joiner Area, and the area outlined in the above surveys, will be the first to go on the pump for the reason of low permeability. The entire east side of the field has a thin sand section and will be first to go on the pump, due to the thinness of the saturated sand section.

Bottom Hole Pressure

The bottom hole pressure of the East Texas field is shown in a sketch map accompanying this article since this factor is more easily and more accurately determined than either the thickness or the permeability of the sand. It may be discussed with more certainty than the other factors. The bottom hole pressure is lowest in the area of Joinerville where it reaches a minimum of approximately 800 pounds per square inch. It is highest in the northeast corner of Cherokee County where it is 1400 pounds per square inch. The pressure along the east side of the field, except the Joiner area, averages 1000 pounds per square inch. The pressure along the west side of the field averages approximately 1300 pounds per square inch. There is a low bottom hole pressure in the vicinity of Kilgore which is probably due to heavy withdrawals in this area. The high bottom hole pressures along the west side of the field are due, primarily to the water replacing the oil as it is withdrawn from the immediate vicinity. A secondary reason for the high pressure along the west side is that the total thickness of the sand section is greatest along the west side, even though only a thin portion of the sand section contains saturated oil.

A question that has been frequently asked the engineers is at what bottom hole pressure the wells will cease to flow in East Texas. Since the bottom hole pressure itself, is a secondary factor in the flowing of the well, there naturally will be great variation in the bottom hole pressure of the various wells at the time they reach the pumping stage. This feature is clearly shown by the fact that a number of wells went on the pump in portions of the field when the bottom hole pressure was as much as 1500 pounds per square inch. Other wells continued to flow when the pressure was reduced to 800 pounds per square inch. There no doubt will be a great many wells in the field which will flow when the bottom hole pressure is reduced to 500 pounds per square inch. However, these wells will all be exceptions and not the rule. Probably the last portion of the field to go on the pump will be along the Sabine River in the F. W. Johnson Survey, where a combination of high bottom hole pressure, shallow depth to the sand, high permeability of the sand, and great sand thickness will prolong the flowing life.

Since the bottom hole pressure of the field can be very accurately determined, a great deal is known about the bottomhole pressure, due to the excellent work of the engineers of the railroad commission and the engineers of the major companies. It serves as an excellent yard stick by which to measure the time at which the wells will go on the pump. However, the use of bottom hole pressure alone to determine the pumping stage is likely to lead to great errors in estimating the time at which the wells cease to flow. This fact is shown by the error which a great many engineers made in May, 1933, immediately after the field had started producing a million barrels per day and the pressure decline was approximately 4½ pounds per day. Estimates based upon bottom hole pressure at this time, placed the time at which the field would go on the pump at the latter part of July, 1933.

Distance From the Water

The location of the wells in the field, with reference to the water table, is a minor factor in the flowing life of a well. However, due to the water movement tending to maintain the pressure along the west side of the field the wells which are located near the 3280 sub-sea structual contour will probably have a long flowing life. The wells which are located in the vicinity of the 3310-3320 structural contours will probably go on the pump when they begin to produce 25 to 50 per cent water. The water being approximately 30 per cent heavier than the oil will cause the well to go on the pump much earlier than it would if it were making pipe line oil.

INSERT MAP

A map prepared by Mr. Hudnall of the East Texas field showing the classes of ultimate recovery by pumping methods will be found in this issue as a special insert supplement. On this map is projected the pumping recovery, based on certain factors, and classified as to the desirable type of pumping equipment.

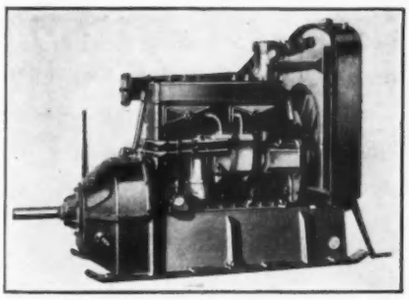
Depth of the Well

The depth of the oil wells in the East Texas field varies from a minimum of 3415 to a maximum of 3820. The field is so uniform in topographic and structural relief that the depth has not been considered seriously as a factor in selecting pumping equipment. However, a study of the accompanying map shows the variation in the depth of the wells throughout the field. This variation in depth is due to both topography and structure. The topographic relief varies from a minimum of 268 feet above tide along the Sabine River to a maximum of 568 feet in the area one mile north of London. This gives a maximum topographic variation of 300 feet. The effect of

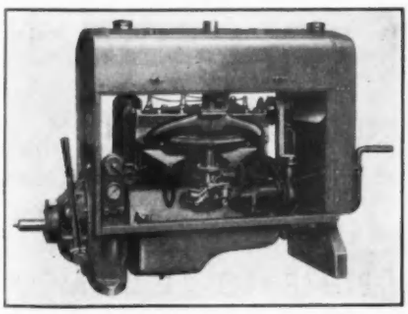
SERVICE.....

AND SOMETHING MORE

Waukesha Service Station, Greggton, Texas (near Longview), in former Bridgeport Bldg.—a branch of Portable Rig Co., main plant and offices at Houston.



Explosion-Proof Unit with water-cooled manifold, sealed ignition and oil bath clutch.



Standard Housed Unit—Conventional Type.

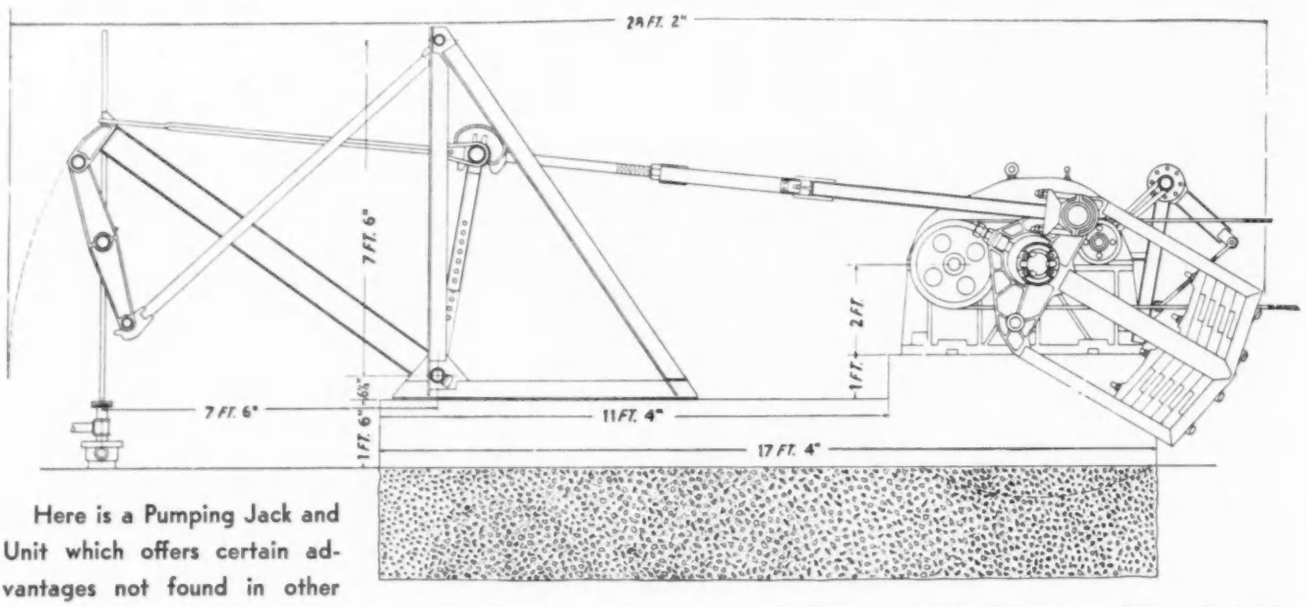
Waukesha Oil Field Engine users everywhere have the satisfying assurance that Waukesha Service is always available, if needed. At Greggton, Texas, is the Waukesha Service Station for the East Texas oil fields. Here the Portable Rig Company maintains a large stock of repair parts for Waukesha Engines of all models. • There is a modernly-equipped engine repairing and rebuilding shop . . . and an adequate staff of skilled Waukesha mechanics on call, day or night. Complete sales and engineering facilities are backed by Waukesha's successful operating records over a period of eight years. • But Waukesha Service means something more than parts or engineering . . . it represents a manufacturer's unfailing interest in the performance of his product. Waukesha is an institution that feels its responsibility to a great industry and is always ready to discharge every duty such responsibility entails. • *Waukesha Motor Company, Waukesha, Wisconsin.*

SPECIFY WAUKESHA SIXES ON YOUR WINCHES

WAUKESHA ENGINES

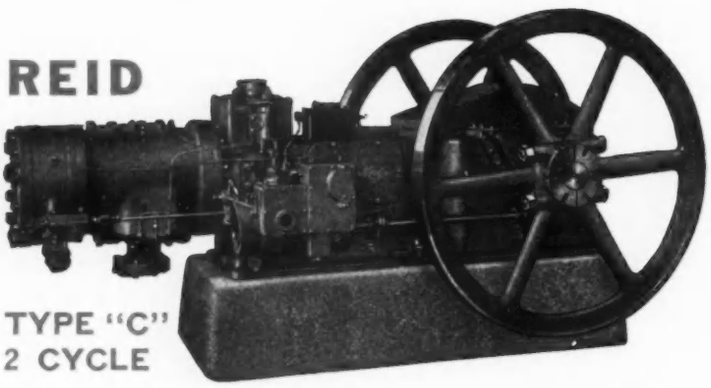
PUMPING EQUIPMENT - FRICK

MASTER No. 1154 PUMPING UNIT AND MASTER No. 54 PUMPING JACK



Here is a Pumping Jack and Unit which offers certain advantages not found in other types. Note the design—jack gives a straight lift—will not drop rod load on stuffing box—does not wabble or crawl—has slow starting lift and an easy stroke adjustment—maximum stroke being 72 inches—lubrication through alemite fittings. Bronze bushed bearings. Jack can easily be moved out of way for pulling rods, tubing, etc. The unit consists of jack connected to Frick-Reid-Ottumwa speed reducer and balanced counter weights. Prime Mover—any 15 to 25 H.P. single cylinder gas engine with suitable sheaves and clutch.

REID



TYPE "C"
2 CYCLE

Available in sizes 35—40—45 H. P. to 14½ x 18 and 15 x 18". Both latter sizes developing over 100 H. P. at moderate speeds. Thoroughly proven power sources combining economy—dependability and continuity of performance in years of hard service.

AXELSON

A. P. I. Standard No. 55 and A. P. I. Amco No. 60 Sucker Rods. Pull Rods. Pumps (Working Barrels). Stuffing Boxes.

BEAUMONT

Tubing Blocks—Steel Sampson Posts and Pitmans—Tubing Heads—Steel Walking Beams—Hoisting Winches—Pedestal Sheaves and Base. Tubing Spiders—Tubing Tongs.

JONES and LAUGHLIN

J & L Seamless Tubing—Plain and External Upset Types. Casing, Line Pipe, Drill Pipe.

CONSULT WITH OUR NEAREST
YOUR PUMPING EQUIPMENT

FRICK
SUPPLY CO

PITTSBURGH, PENNA.

-REID - "OF PROVEN MERIT"

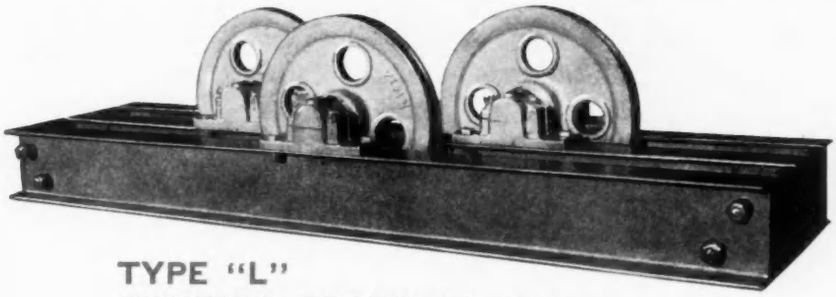
REID BAND WHEEL POWERS - FOR MULTIPLE WELL PUMPING ECONOMY

Eighteen and more years of hard continuous service on numerous installations has proven conclusively—beyond any doubt—that the Reid Band Wheel Power offers the "Last Word" in true economy as a central power for multiple well pumping. A size to meet every requirement. The sound engineering principles incorporated in their design and construction enables them to handle maximum loads easily and smoothly and to absorb the heavy shock loads encountered in oil well pumping.

ROEBLING'S
Wire Lines and Welding Wire.

WHITLOCK
Manila Cordage

REPUBLIC Super-Excelo BELTS
Meet and exceed A. P. I. specifications. Duck used is 43-1/3 oz. silver hard. Friction is the very highest quality. Either raw or folded edge types. Prompt shipments on endless belts.



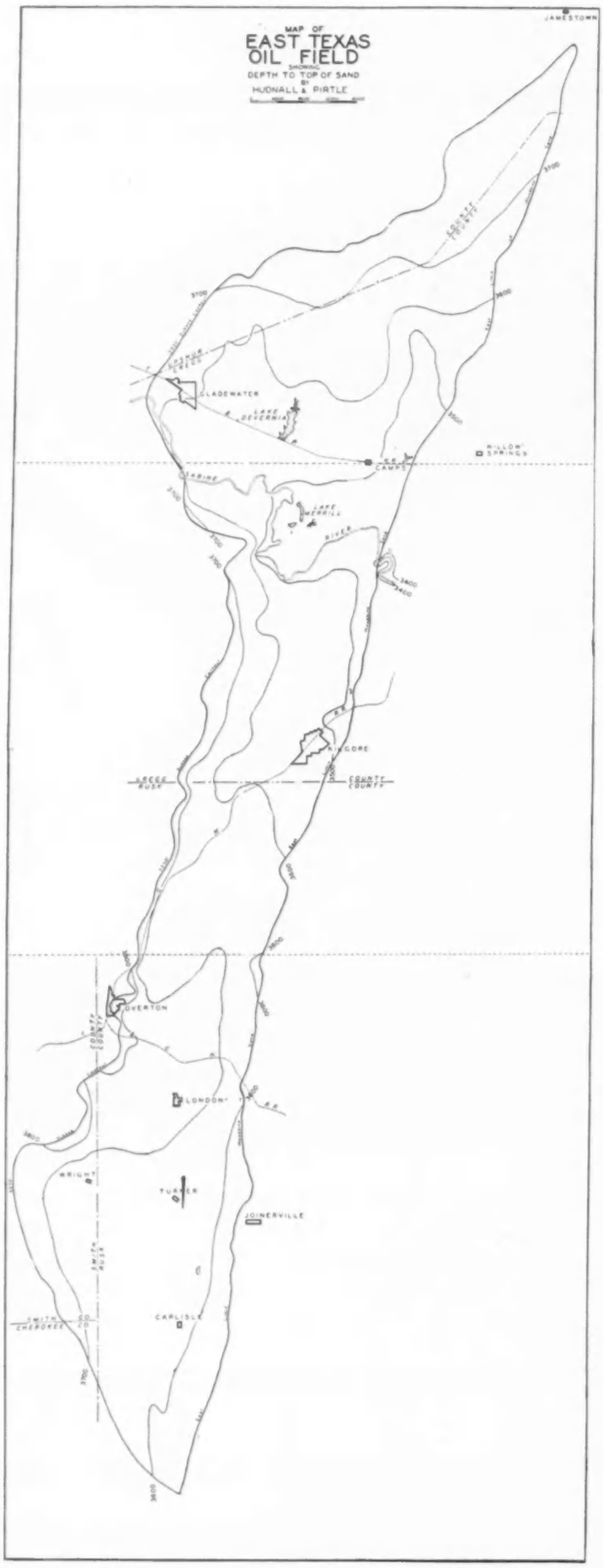
TYPE "L"
PUMPING CROWN BLOCKS

Have demonstrated their strength and economy of operation on derrick after derrick. Any desired combination of sheaves and beams available. Beams in 8", 10" or 12" sizes. Sheaves 20", 22" and 26" diameter of semi-steel with A. P. I. grooves. Adjustable bearing boxes—bronze bearings. Efficient lubrication.

REPRESENTATIVE REGARDING NEEDS OR PROBLEMS . . . .

-REID
R P O R A T I O N

TULSA, OKLA.



topographic relief on the flowing life can be more readily understood when the relation of the two are shown. A variation of 100 feet in topography is equivalent to 33 pounds in pressure or the total variation of 300 feet in topography, represents a total variation of 100 pounds in pressure. Other factors being equal, the wells located in the areas of high topography will cease to flow from three to six months sooner than those on the lowest topography. The maximum variation due to the structure (dip of the formation) is from a sub-sea depth of 3110 in the area one mile northwest of Joinerville to a sub-sea depth of 3340 in the area three miles northeast of Overton. This gives a structural relief of 230 feet.

The depth map is made by superimposing the structural relief upon the topographic relief. The wells of greatest depth are located in the vicinity of Overton where the maximum depth of slightly more than 3800 feet is obtained. Another area of great depth is along the western side of the field northwest of Wright City. These great depths are due to a combination of high topography and low structure. The minimum depths are on the east side of the field, along the Sabine River where production is 3400 feet. The depth in the Gladewater area, in general, is approximately 100 feet less than the Joiner area.

Rate of Withdrawal

The present rate of withdrawal is, to some extent affecting the flowing life of the field. A high rate of withdrawal for the pool, as a whole, will shorten the flowing life, and lengthen the pumping life. Areas that have a heavy withdrawal due to the density of drilling will go on the pump sooner than those which are sparsely drilled, due primarily to the inability of the pressure to equalize as fast as the withdrawals occur. The areas which will go on the pump due to the intensity of drilling are Kilgore, Overton and London; Gladewater being located in a thick and more permeable sand area and in proximity to the water will have a much longer flowing life than Kilgore, Overton and London. There are other areas in the field which are densely drilled which will go on the pump earlier than the average in the field.

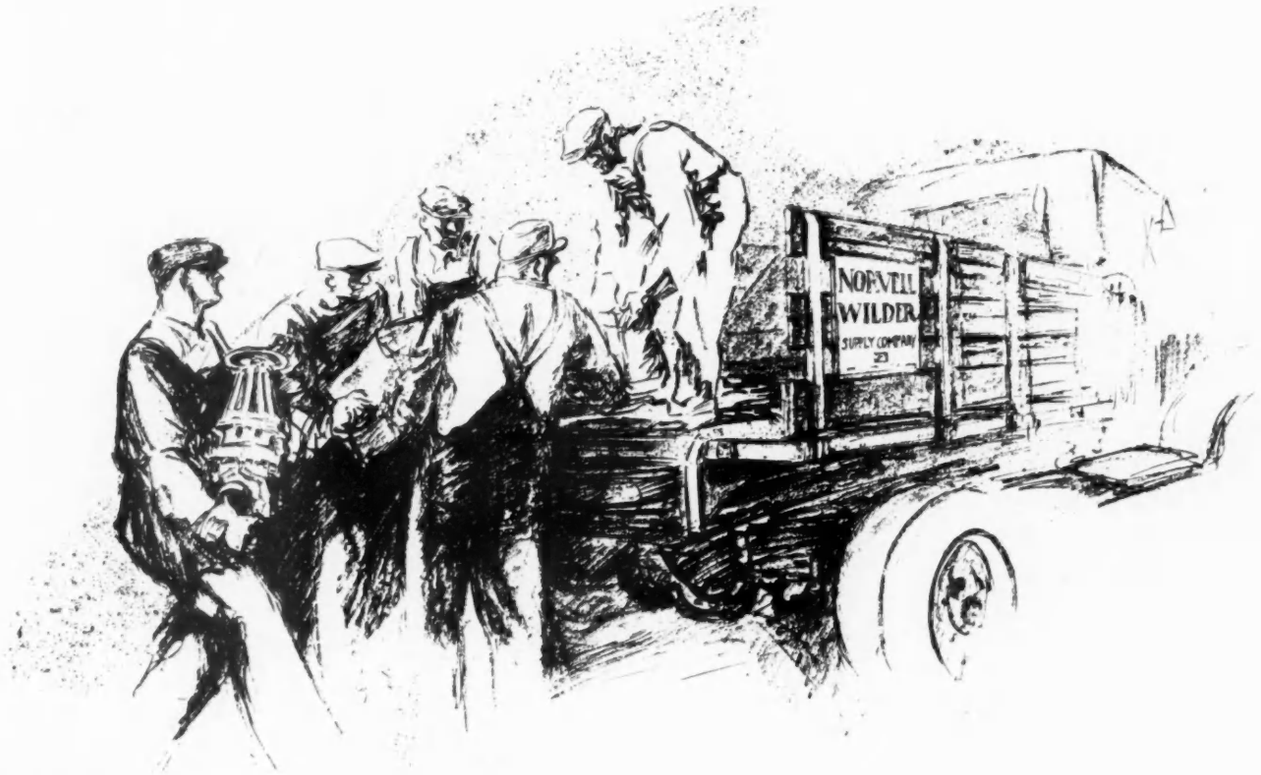
Classification of Machinery Upon Work To Be Done

The expenditure of $54,000,000 for pumping equipment justifies a very thorough consideration of the amount of work which is to be accomplished before selecting the machinery. It is not the purpose of this discussion to go into the various types of equipment or the various methods of pumping oil wells, however, the amount of work which is to be performed by the machinery, in a broad classification, is attempted in this discussion.

The amount of work which the pumping equipment would be subjected to in the East Texas field is dependent upon the amount of fluid times the weight of the fluid times the distance it has to be lifted. Obviously, the greatest variable in this formula is the amount of fluid to be lifted. Wells may be grouped into three classifications based upon the amount of fluid which will have to be pumped:

(a) Wells whose ultimate recovery, by pumping method will average 200,000 barrels each.

(b) Wells whose ultimate recovery, by pump-



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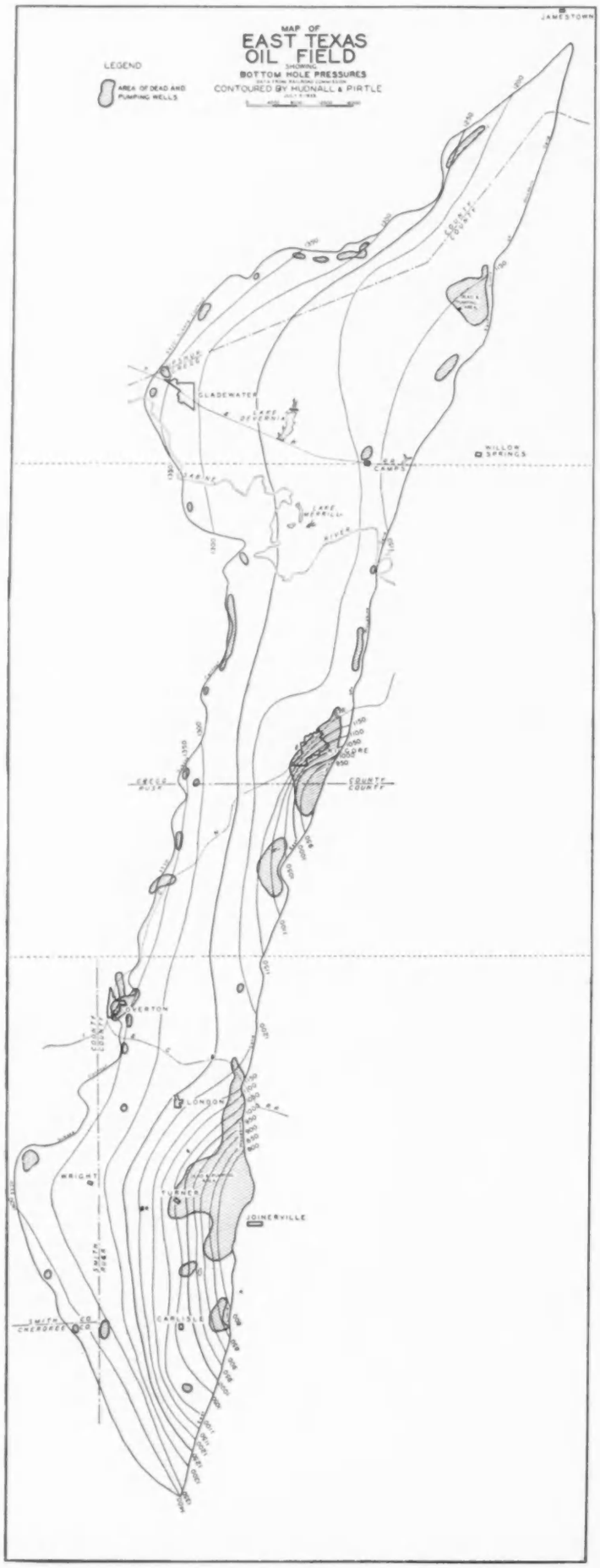


ing method, will average 100,000 barrels each.

(c) Wells whose ultimate recovery, by the pumping method, will average 50,000 barrels each.

In the above classification, class *a* will contain all the wells which will ultimately pump 150,000 to 250,000 barrels. Class *b*, all of the wells which will pump 75,000 to 150,000 barrels. Class *c*, all of the wells from 25,000 to 75,000 barrels.

The above classification is based largely upon the belief that throughout the field, the wells will flow 20 per cent to 35 per cent of their ultimate production; the remaining 80 per cent and 65 per cent being produced by the pumping method. Realizing that the per cent of oil that a well will produce by the flowing method involves, to a large extent, the question of "what causes a well to flow," and realizing that there are two schools of thought on the question of whether, in the East Texas field, the propulsive force which causes the wells to produce and flow, is gas energy or water energy, the following facts are set out for the consideration of the reader:

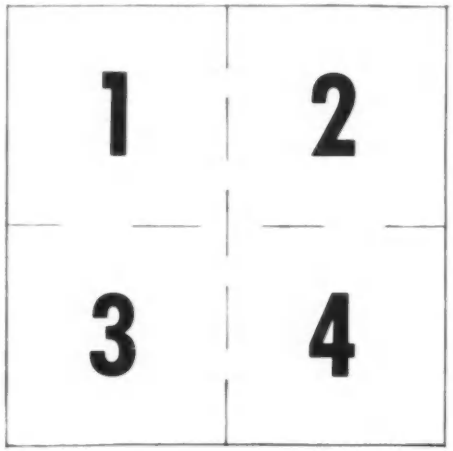
Gas Energy Evidence

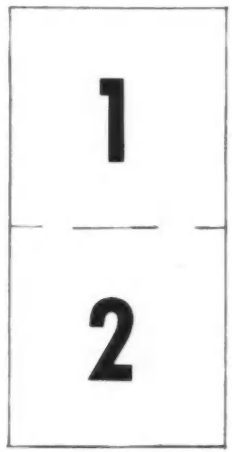
In the East Texas oil field, a great many wells have been permitted to produce at a much more rapid rate than allowed by the railroad commission under its proration orders. Wells in the middle of the field and on the edges have been produced at a rate of 2000 barrels per day or more, for several days until the wells ceased to flow. The offset wells and wells east of those which ceased to flow, continued to flow. A study of the forces which causes these wells to flow and then cease to flow, can lead to but one answer. This answer is that the force which was keeping the well flowing was within the drainage area of the well, and, that when the force which was within the drainage area of the well was dissipated and used up, the well ceased to flow. Since there was no water within the drainage area of the well as shown by the fact that the well did not produce any water, and by the fact that the well was located in the eastern portion of the field where there is known to be no water, then the propulsive force could not have been water. Since each and every well that has ever produced considerable gas with the oil, and since this gas, before it was produced, must have been in the sand, it is only logical to assume that the propelling force which caused the well to flow was the expansion of the gas associated with and absorbed in the oil.

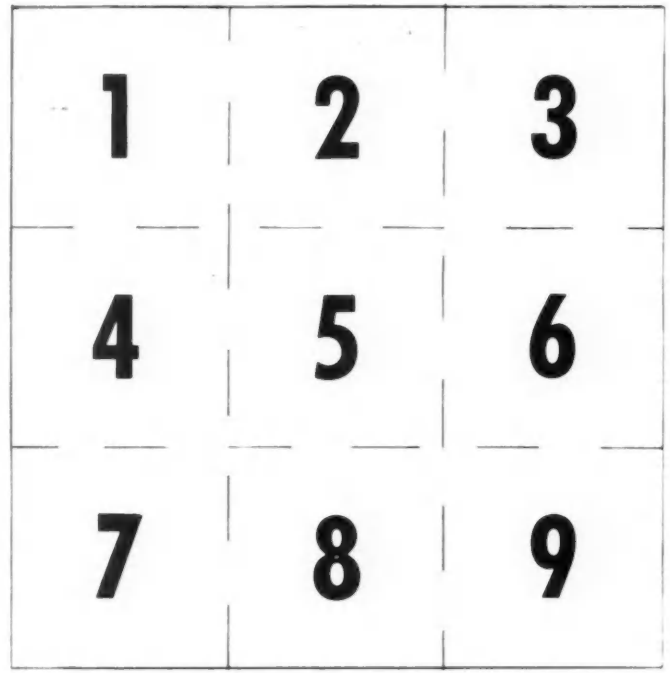
In addition to this evidence, the writer has witnessed a number of tests whereby an individual well was permitted to flow at a rate of 2000 to 5000 barrels per day for several hours during which time the bottom hole pressure instruments were placed in the offset wells with clocks permitting a continuous record of the bottom hole pressure decline. These tests all showed that the pressure decline area was circular around the well being greatest in the well flowing, decreasing in the wells more distant from the flowing well. Contour lines on pressure decline shows that the drainage area of the well was very circular; likewise bottom hole pressure tests have been made in wells surrounding one with a leaking casing, the leak amounting to a few hundred thousand barrels. The pressure decline lines in this area showed that the drainage area was essentially

(*Continued on page* 111)

Maps on this order too large to be entirely included in one exposure are filmed clockwise beginning in the upper left hand corner, left to right and top to bottom as many frames as required. The following diagrams illustrate the method.







MAP OF EAST TEXAS OIL FIELD

SHOWING

THE CLASSES OF ULTIMATE RECOVERY BY PUMPING METHODS.

COMPILED BY
HUDNALL & PIRTLE.
CONSULTING GEOLOGISTS.
TYLER, TEXAS.

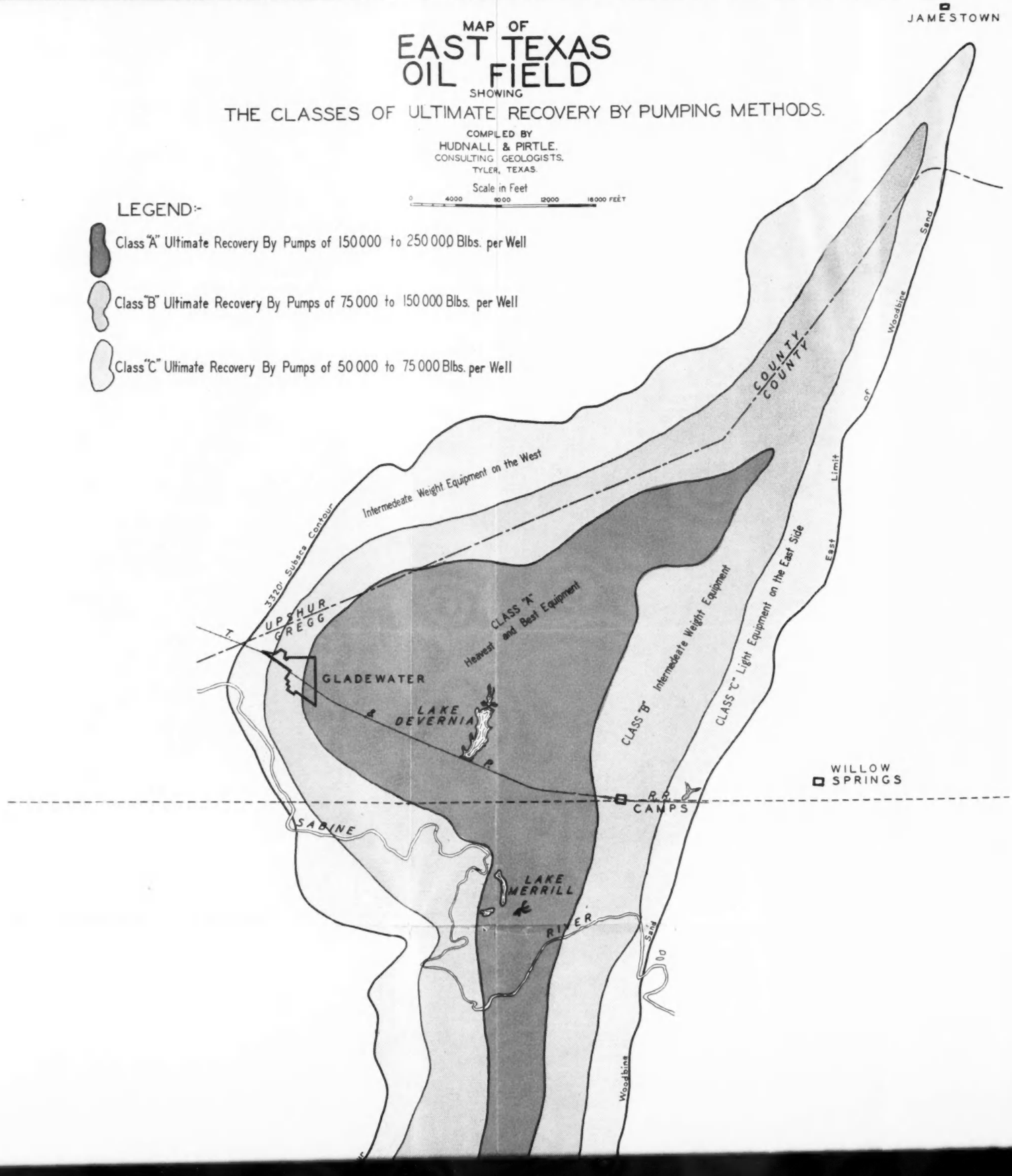
Scale in Feet
0 4000 8000 12000 16000 FEET

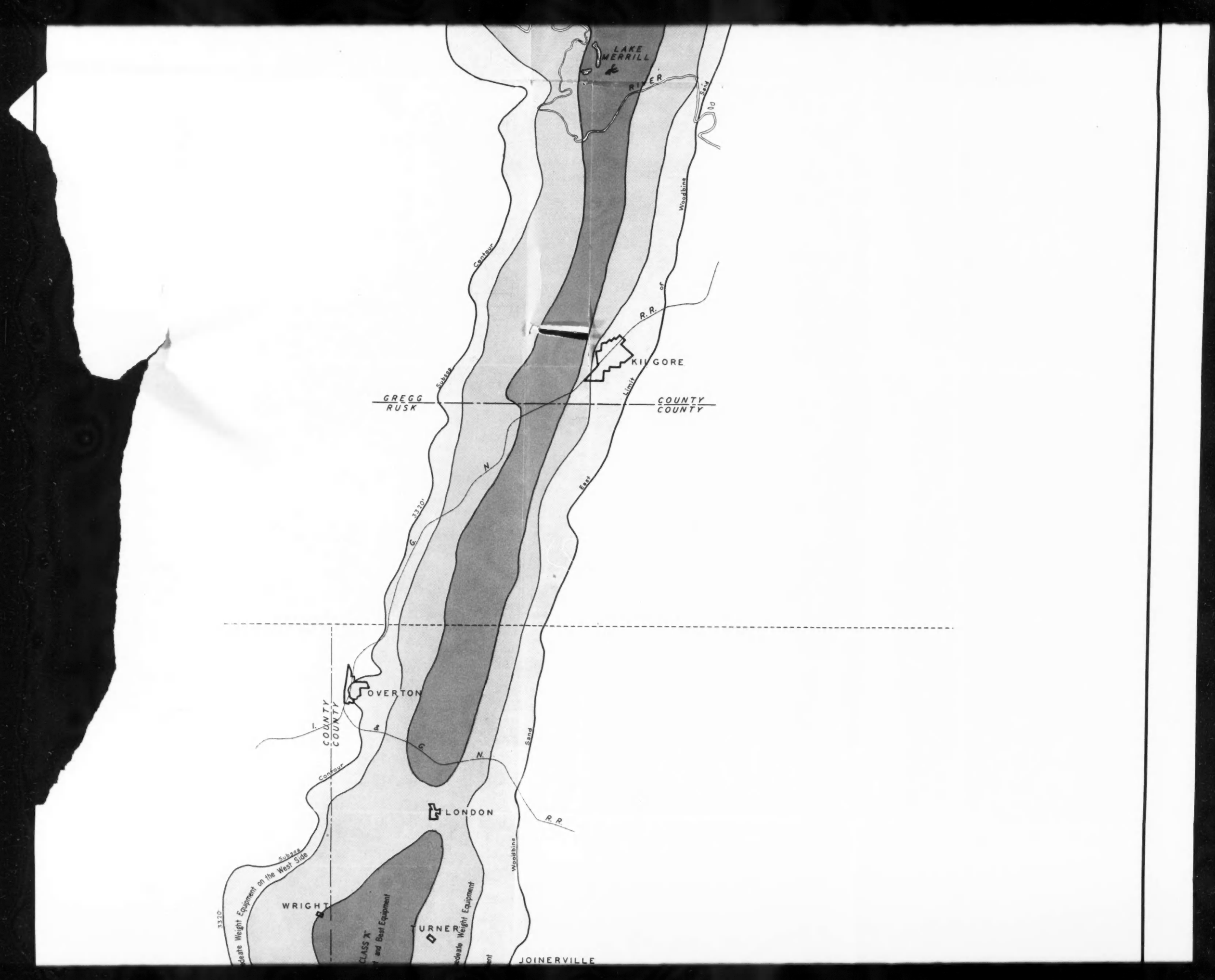
LEGEND:-

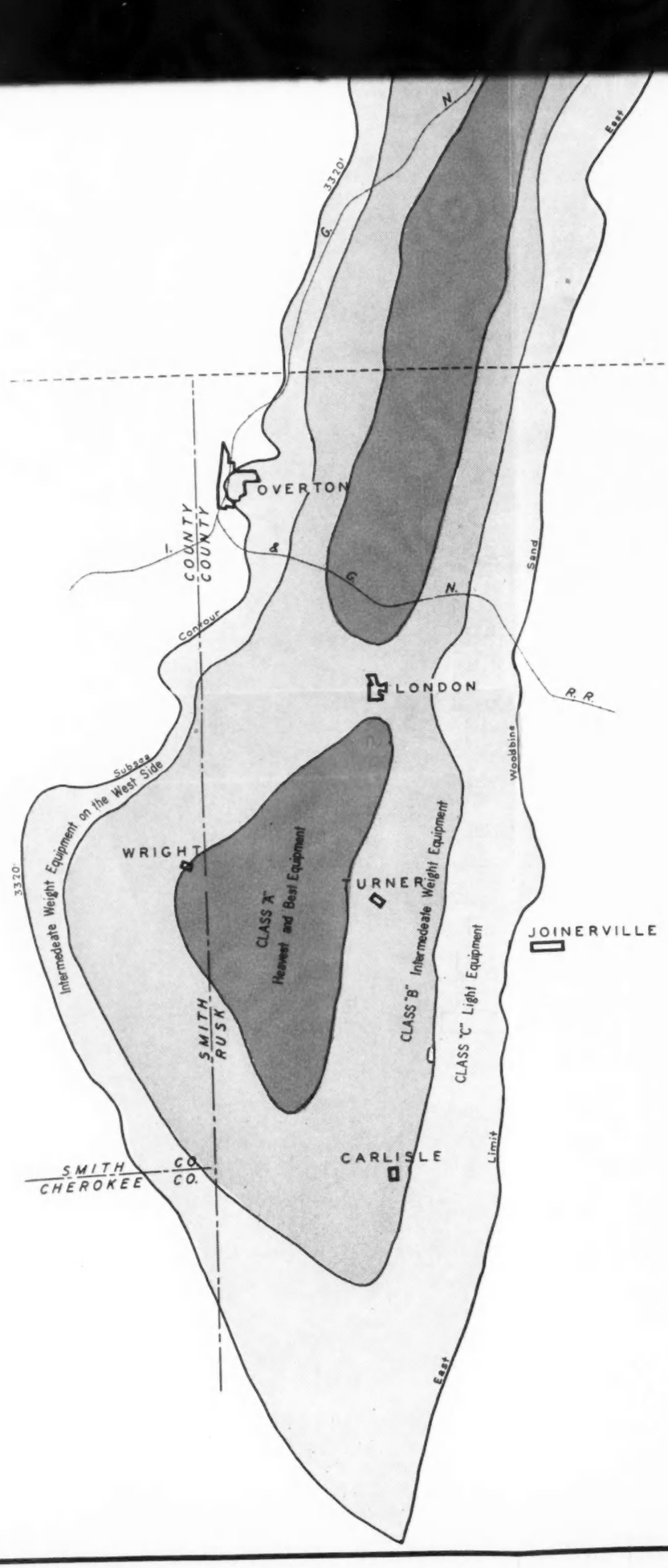
Class "A" Ultimate Recovery By Pumps of 150000 to 250000 Blbs. per Well

Class "B" Ultimate Recovery By Pumps of 75000 to 150000 Blbs. per Well

Class "C" Ultimate Recovery By Pumps of 50000 to 75000 Blbs. per Well




LAKE MERRILL
RIVER
Sand
Woodbine
Contour
R.R.
of
KILGORE
Subsea
Limit
GREGG COUNTY
RUSK COUNTY
N.
East
3320'
G.
OVERTON
L.
&
N.
Contour
LONDON
R.R.
Woodbine
Subsea
WRIGHT
URNER
JOINERVILLE



NOTE: This map is derived from a consideration of the following factors.

1. Estimated recoverable reserves by pumping method	60%
2. Bottom hole pressure	15%
3. Topographic relief	12½%
4. Structural relief	12½%
	Total 100%

Published as a

SPECIAL SUPPLEMENT

To the article "Fundamental Considerations in Selecting Pumping Equipment for East Texas Field" by J. S. Hudnall.

EAST TEXAS PUMPING NUMBER

July 17, 1933

THE OIL WEEKLY

Houston, Texas

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- **WALKING BEAMS**
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- **RIG IRONS**

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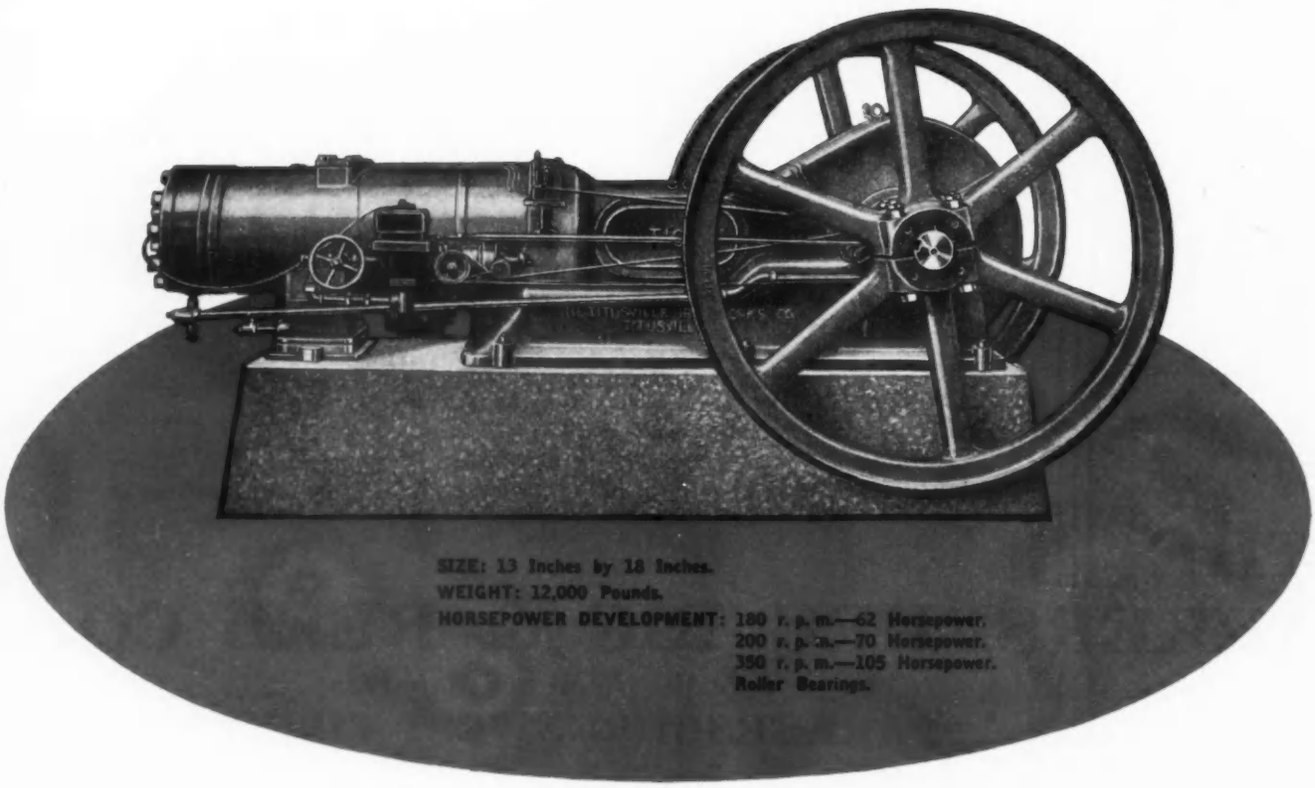
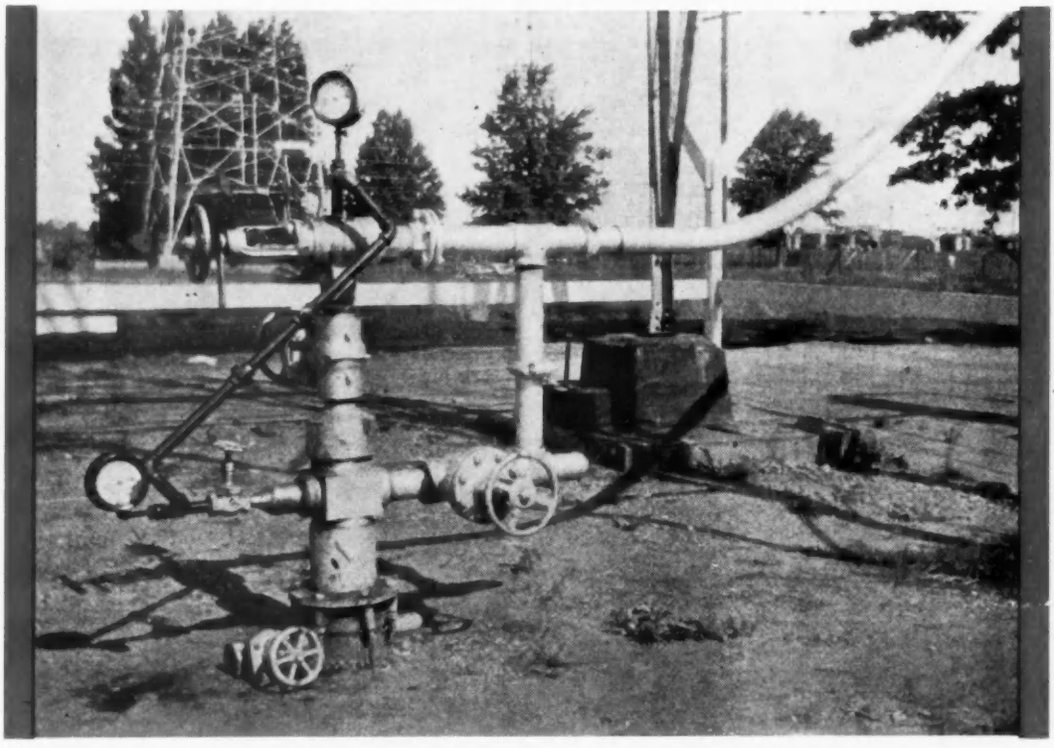


SIZE: 13 Inches by 18 Inches.
WEIGHT: 12,000 Pounds.
HORSEPOWER DEVELOPMENT: 180 r. p. m.—62 Horsepower.
200 r. p. m.—70 Horsepower.
350 r. p. m.—105 Horsepower.
Roller Bearings.



Simple hook-up for forcing live oil from tubing into casing.

Operating Characteristics Govern

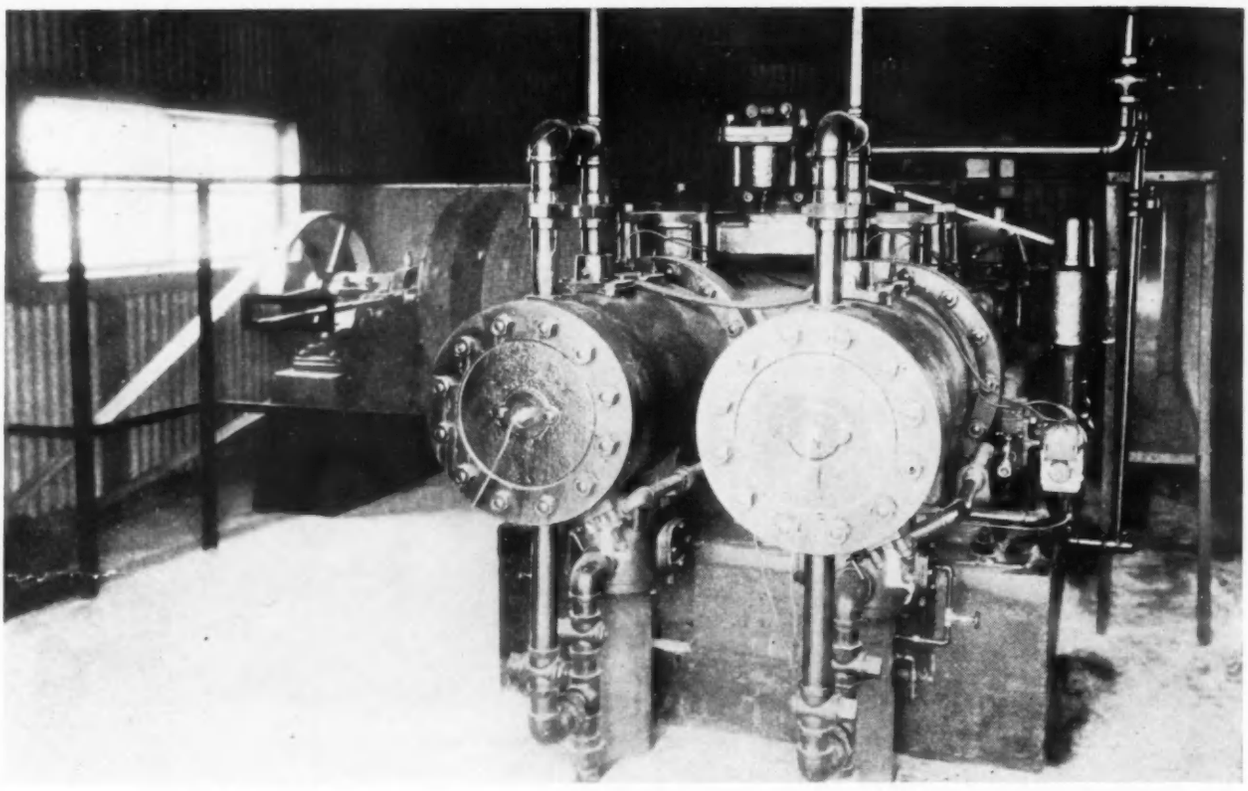
Selection of Prime Movers For East Texas Pumping

HAROLD VANCE

Abundant Supply of Gas Available

ARTIFICIAL methods of producing oil are inevitable in the East Texas field, but from the standpoint of lifting cost and profit on the investment it is essential that natural flow be continued as long as possible. With the continual decline in bottom hole pressure which has been brought about by natural flow conditions together with the effect of an abnormal decline due to excessive withdrawals both legitimate and otherwise, the difficulties of maintaining natural flow are increasing daily.

East side wells being in the area of natural low pressures are the first to go on the pump. Many wells which have gone dead could have been kept alive by a closer check on well pressures, and a study of these pressures during flowing and shut in periods. It is essential that the fluid in both the tubing and casing be kept alive. The easiest, and yet the most impossible method, except for consistent violators of proration is to flow the wells steady at rates not much below 15 barrels per hour. The second best method, in case the well will flow through the casing is to flow the allowable once a week through the casing. This ill fill the annular space between the casing and tubing with fresh oil and increase the closed in casing pressure. If there is any doubt in the operator's mind that the well will not flow through the casing the pressure on the casing should not be released as there are still methods by which this dead oil column back of the tubing may be partially removed and replaced with fresh oil. The method to be used will have to be determined by the operator from a study of the casing and tubing pressures during the flowing and shut in periods. In wells in which the casing pressure drops with a drop in tubing pressure, it is sometimes possible to build up the tubing pressure after the well has started flowing through the tubing so that the flowing pressure through the tubing is 30-40 pounds higher than the closed in casing pressure. In this case part of the flow from the tubing can be injected into the casing. This will add fresh oil at the top of the annular space between the casing and tubing and force some dead oil down and then up through the tubing. The writer has used this method and increased the closed in pressure, flowing pressure, and kick-off pressure over 35 pounds in four days while flowing an allowable of 31 barrels per day. The ac-



Mid-Kansas Oil & Gas Company, M. A. Price lease, near Carlyle, East Texas, equipped with National geared pumping power driven by Superior 100 horsepower, twin cylinder, two-cycle gas engine; friction clutch driving Dayton cog belts to transmission shafting, which operates below ground in a concrete housing.

companying photograph shows the simple hook-up used to force the live oil from the tubing into the casing.

A compressor might also be used to build up the casing pressure, but the pressure should be built up slowly and only while the well is flowing through the tubing so that all the dead oil could be removed through the tubing.

Flow Twice a Day

In cases where the well allowable is sufficient to allow the removal of the fluid in the tubing plus about 5-10 barrels, good results have been obtained by flowing the well twice a day, i.e., half of the daily well allowable at each period of flow. In certain wells this method of flow has increased the closed in, flowing, and kick-off pressures by keeping the fluid alive in the tubing, and also replacing some of the dead oil with live oil at the bottom of the column of fluid between the casing and tubing.

The type of well hook-up is now exerting its influence upon the flowing life of low pressure wells. Wells which have short flow lines and separators set at the well with gravity flow to the tanks can be kept alive longer than wells with long flow lines and a central separator. This is due to the elimination of back pressure.

The immediate necessity of pumping equipment is more clearly seen by an analysis of the bottom hole pressure with respect to the structural location of the wells in the field. On June 8, 1933, the average bottom hole pressure for the field at 3300 feet below sea level was 1240 pounds. This represents a west side condition. On the same date the average bottom hole pressure at the average depth below sea level of the top of the Woodbine sand in the East Texas field, i.e., at 3235 feet below sea level, was 1220 pounds; while in the natural low pressure area in the vicinity of 3160 feet below sea level the average pressure was 1190 pounds. From this analysis it is evident that the figure commonly used as the average bottom hole pressure in the East Texas field is far in excess of what it actually is for the average top of the Woodbine sand in the field, and it is still more misleading when thought of in terms of east side wells.

Advisability of Pumping

Before buying equipment to pump a well in the East Texas field an operator should first decide whether it would actually pay him to put the well on the pump. There are certain areas in the field where the most optimistic operator could figure a maximum pumping life of only five years. This area is the extreme east side and the extreme west side. On the west side the pumping life will be shortened by the encroachment of water, and the pumping life on the east side will be shortened by the natural depletion of the oil. The east side area is probably better off than the extreme west side as the lifting cost will be lower and lighter pumping equipment may be used. Nevertheless both of these areas are within the 20 barrels per day allowable and we can expect no increase of the allowable in this area within the near future, and future potential tests will increase the size of the 20 barrels per day allowable area. On the June 14 allowable schedule there were 453 wells allowed only 20 barrels per day.

Now let us consider the future of the operator who has just completed a pumping well in the townsites located in this 20-barrel allowable area. The well will cost complete ready to pump, approximately $14,000. Let us assume

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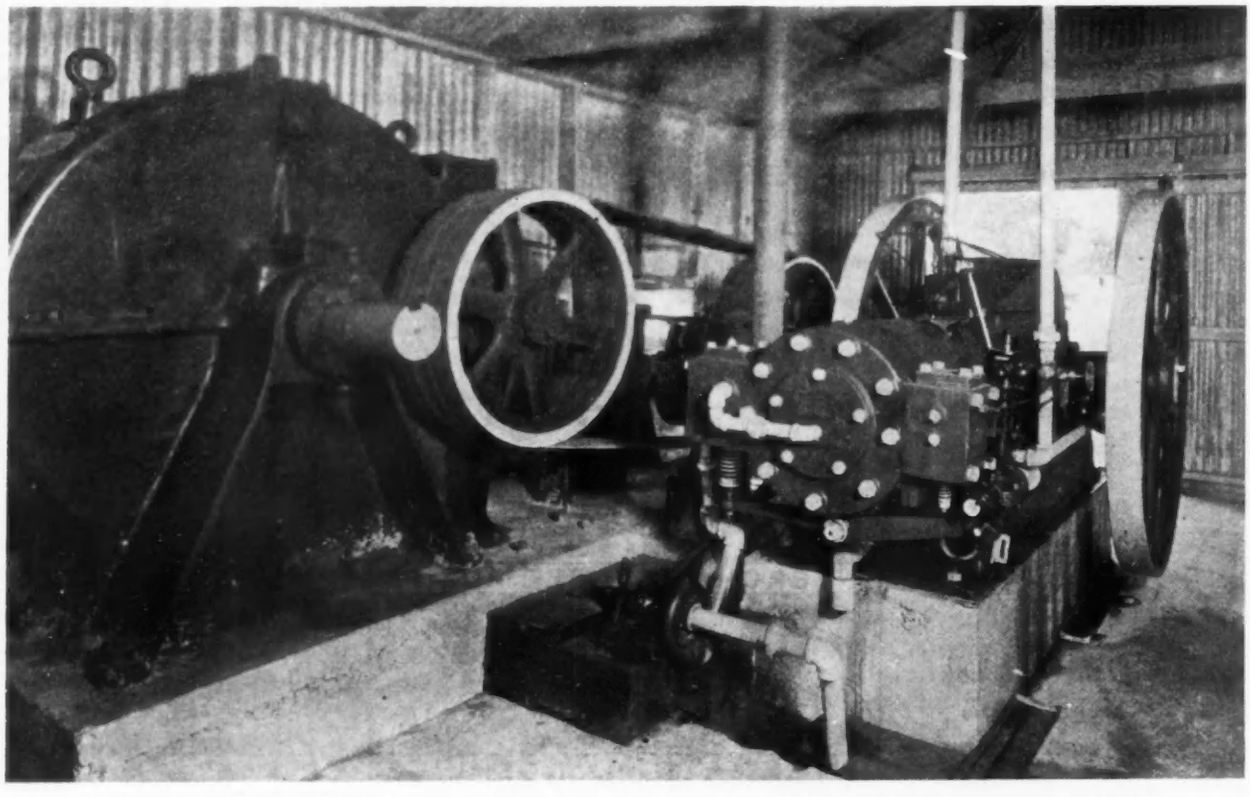
that the operator owns the full ⅞ leasehold interest and that the lease has cost him nothing, which is rarely the case. Based upon the most recent tax valuation the value of this well for tax purposes amounts to $12,500, and with a city tax rate of $2.00 per hundred, state and county at $1.50 and independent school district at $1.00, makes a total tax rate of $4.50 per hundred or a total of $562.50 per year. To this amount must be added a gross production tax of $.02 per barrel which becomes effective about September 1, 1933, and amounts to 20 x 365 x $.02 or $146 for the year. This makes a total cost per year for taxes alone $708.00. Also to this must be added a lifting cost of approximately $100.00 per month or $1,200 per year, making a total yearly expense of $1,900 to which must be added the interest on the investment for the first year, i.e., 8 per cent of $14,000 or $1,120 which makes a grand total expense for the first year of $3,028.00. The income from this well at 20 barrels per day and $.75 oil, less the royalty, amounts to $4,790.00 for the first year, which minus the total expense for the years leaves $1,762.00 to return the well investment the first year. For wells located outside the townsite limits this return for the first year would be increased to $2,012 on account of the saving in city taxes. From a study of the above analysis it is very evident that it is impossible to drill wells under the present conditions in the 20-barrel per day area, if it is necessary to put the wells on the pump as soon as completed.

Pumping Equipment

In an area as large as the East Texas field with over 10,000 wells and 1000 different operators one can expect every conceivable type of pumping equipment to be used. Many operators are installing the equipment which they already have available from other fields. This equipment has been overhauled and put in good shape and will serve their needs well and economically at small investment. This equipment is mostly individual well equipment which is capable of taking care of all future pumping requirements. Central power plants are being installed in large numbers and their use is well justified on leases of over 10 wells and if located on the east side. The local topography has considerable bearing upon the first cost and future lifting cost of wells equipped to pump from central powers. Additional powers could be profitably installed on smaller than a 10-well lease as in many cases outside wells could be pumped from this power which would help return the power owners' investment as well as relieve the investment cost on the outside lease owners. With jacks having adjustment for stroke and the use of multipliers the productive characteristics of the individual wells may be taken care of. The installation of central powers should be confined to the east side of the field as a power installation on the west side will not be able to take care of the water which eventually will be produced there.

As to individual pumping units the operator has a wide range of equipment to select from. The old type standard rig will prove as satisfactory in the East Texas field as it has proven in other fields. Large individual pumping units are even more satisfactory than the old type standard rig for general use throughout the field. Steel should replace wood and all machinery should be set on concrete foundations. On the extreme west side of the field the old type standard rig is recommended and this may be second hand if in good condition. This type pumping outfit is recommended on account of relatively low first cost, adaptability to high pumping speeds and long stroke, and the short pumping life of wells located in this area. On the extreme east side a second hand standard rig in good condition or some of the small double crank individual



Spear well, Kilgore, East Texas, is equipped with 6½-inch Lufkin herringbone unit, driven by single cylinder Superior gas engine.

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THE NEW IMPERIAL OIL-BATH GEARED POWERS

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★ ***"Oilwell" Single Crank Imperial No. 80-SC provided with 30" and 36" strokes.***

NEW DESIGN, All-Steel, Heavy Duty No. 16 and No. 12 Pumping Jacks —

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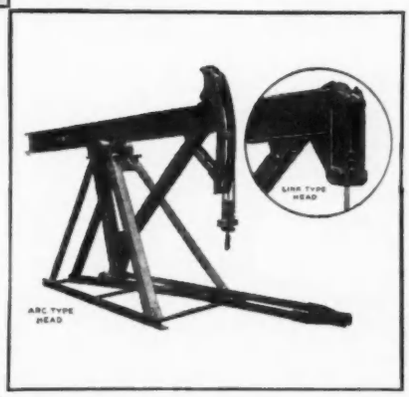
"Oilwell" No. 16 Jack — 16,000-lbs. polished rod load rating. ★



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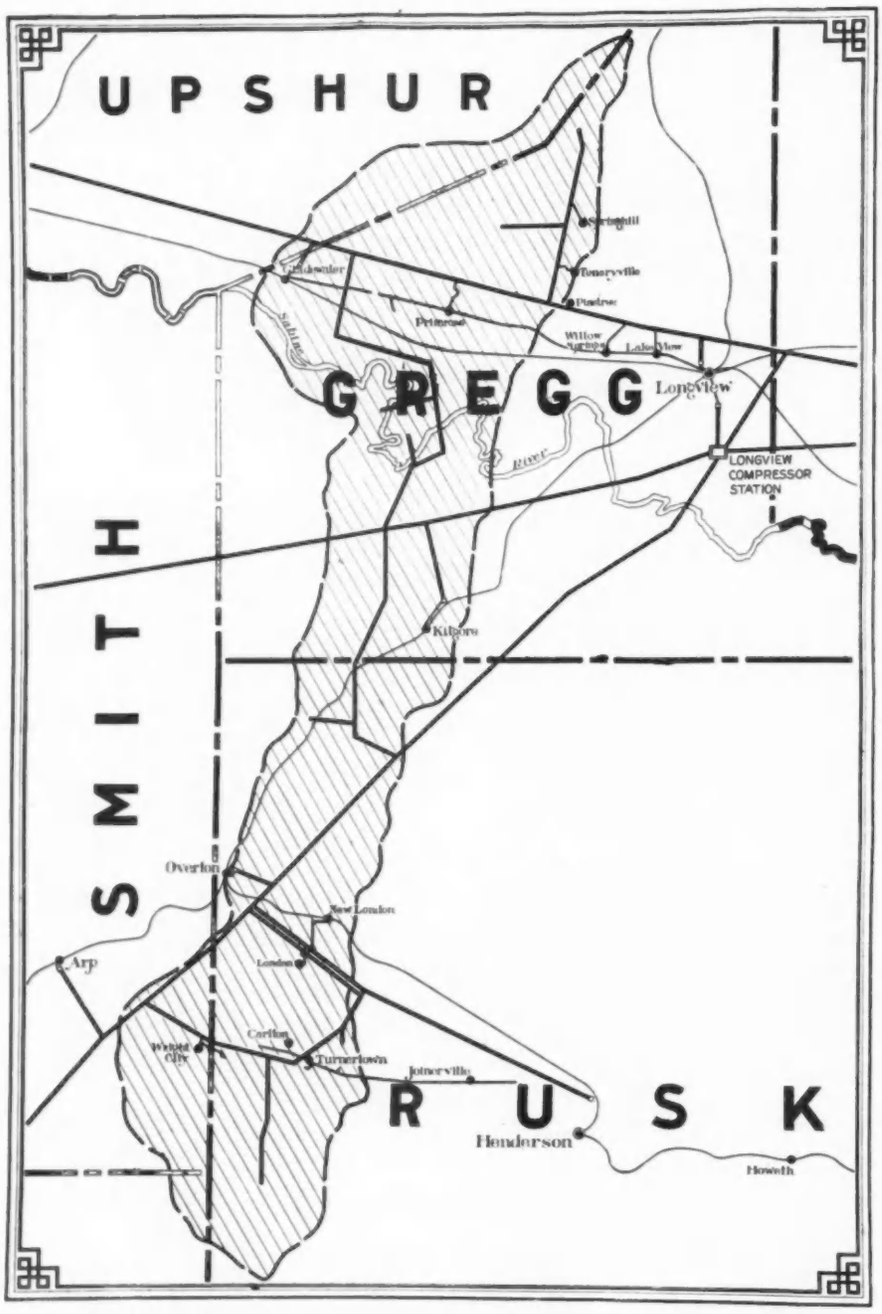
pumping units will prove satisfactory as well as the use of jacks operated from a central power plant. There is little difference in cost between a second hand standard rig installed and a small individual pumping unit of suitable capacity. The operator will have to decide for himself what equipment is best suited for his lease or well after considering the location of the property, material which he has on hand, first cost of material, either new or second hand, and operating cost both from the standpoint of pumping and pulling operations, and the salvage value of this equipment after depletion of the oil.

The air or gas lift will prove satisfactory and its cost should be low when operated in connection with a gasoline plant. It may even pay to install compressor plants.

Type of Prime Mover

With an average gas-oil ratio of 325 cubic feet of gas per barrel of oil produced in the East Texas field, and 90 per cent of this gas blowing into the air, the operator is confronted with the problem of whether he should use this gas to operate his prime mover, or go outside and buy gas or electricity. The amount of gas produced per barrel of oil will increase after the bottom hole pressure has dropped below 750 pounds until it is drowned out by water. The gas consumption per brake horsepower hour for a 40 horsepower gas engine will range from 15-20 cubic feet per hour, or a gas engine developing 20 horsepower for 24 hours will use approximately 10,000 cubic feet of gas which is equivalent to 30 barrels of oil at the average gas-oil ratio which exists in the field at the present time.

High pressure gas lines now serve the field and operators in need of some outside gas may secure it for $.22½ per M.C.F. for the first 200 M.C.F. and $.11¾ for all additional. There is no minimum charge.



United Gas Public Service Company's gas distributing system in the East Texas field.

Electric power is available in all parts of the field but its use is prohibitive except where the relative cost of the prime mover over a period of years offsets the difference in cost of the power used. On the basis of horsepower the cost of new electric motors is about one sixth that of equivalent horsepower gas engines installed and there will be a number of acres in the purchase of new equipment where the operator over a period of years may save money by paying the high electric rates. As in the case of purchased gas the large consumer of electricity is the favored operator, as he can keep the cost per K.W.H. at a fairly reasonable figure by keeping the demand at a minimum. In order to keep this demand charge down, small motors are installed for pumping purposes only and the pulling is done by winch trucks or tractors.

In selecting a prime mover, either gas engine or electric motor, consideration should be given to the operating characteristics of the two types. For example the electric motor is designed to operate at its maximum efficiency at its rated horsepower and will operate without damage at considerable overload, whereas, a gas engine will not give satisfactory service for any length of time if operated continuously much above half its rated horsepower. With a standard make gas engine an operator may expect economical operation cost when engines are operated continuously at not much above half the rated horsepower. Four cycle gas engines give better overall service than two cycle gas engines, but lack the speed often desired in pulling operations.

It would be as unreasonable for one to suggest that an operator use gas engines in preference to electric motors or vice versa, as it would be to say that the rotary method of drilling be used exclusively in preference to cable tools. It is up to the operator to decide after a thorough study of his properties and their requirements just what type of equipment and prime mover will give him the largest return on his investment.

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CHEAP electric power in East Texas makes your pumping problem easy. You can get electric power at any well, on any lease, immediately, and it costs you less to equip and pump with electricity. • First cost of equipping with electric power is less than with any other power. There is practically no maintenance on an electric motor. It has one moving part and two bearings. Saving in maintenance and rod trouble often pays the entire cost of electric power for pumping. • We would like a chance to show you the figures. If you need it we will furnish engineering counsel without cost. 'Phone, wire, or write the Commercial Department, Shreveport, Louisiana.

SPECIFIC ADVANTAGES

1. Electric power is available right now. Our lines criss-cross the East Texas field. No time lost.

2. It costs you less to equip. Electric-driven jacks and rigs cost less to buy and install than other types.

3. Your total pumping cost is lower with electric power at the rates in East Texas. We can show you some case records on this.

4. You save enough on fixed charges, rig maintenance and rod costs on an electric rig to buy your power.

5. You have less shutdown time with electric power. You save plenty of time on less rod trouble and time lost on maintenance. Shutdown time is not so important right now, but it will be when the field is really pumping.

6. There are no water or gas lines to freeze up when you use electric power.

7. You get much better overall efficiency with electric power.

8. For flexibility and controllability nothing can match electric power. It goes to work at the touch of a button. It is always on the job in just the right amount—all you need but no waste.

9. One bill for electric power makes your records easy to keep. You know what it costs to pump, and your costs are not hidden in a dozen different accounts.

10. You have fewer accidents on an electrically-operated lease. Properly installed, an electric installation is fool-proof.

11. Your labor cost is less with electric power, and there is a saving on miscellaneous small tools and supplies.

SOUTHWESTERN GAS & ELECTRIC CO.
GENERAL OFFICES - SHREVEPORT, LA.

Downstroke Conditions *Greatly Affect* "Below-ground" Efficiency

ROBERT R. ROBINSON
Consulting Engineer, Martin Decker Corp., Long Beach, Calif.

PUMPING efficiency is not merely a question of power. It is the combination of investment, depreciation, maintenance and lifting cost in such a manner that the total cost of raising the average barrel of oil is at a minimum. Savings must always be made in the direction which will have the greatest effect on ultimate average lifting costs.

Pumping gears are selected on a basis of high efficiency, and we pay more for higher efficiency gears. We consider a five or 10 per cent difference in gear unit efficiency a big factor, and yet when in operation on the well we tolerate efficiencies of 20 per cent when it is possible to get 50 per cent and higher. The possibilities of increased power economy in properly selecting speeds, strokes, pump sizes, and counterbalances are surprising to anyone who has not actually followed a consistent well-weighing campaign directed toward that end.

As consulting engineer for the manufacturer of the pump dynamometer, the writer has had occasion to test large numbers of wells in many different fields operating under almost every known pumping condition, and to analyze thousands of dynamometer cards. Further he has had the opportunity of co-operating with the engineers and field men of many of the operating companies in conducting experiments and tests to obtain comparative data on many types of pumping equipment as well as upon many wells to determine conditions productive of maximum overall operating economy.

With such a large amount of data at hand from all types of producing wells, from those producing a few barrels per day to those producing two thousand, from wells less than five hundred feet deep to those with pumps set below 6000 feet, the writer has found certain operating defects which show up time and time again which not only result in large power losses but which also are productive of high maintenance charges. When it is possible to make savings as high as 50 per cent in these two items alone throughout a producing property by eliminating these defects, with a negligible investment, a careful investigation of the possibilities in this direction is certainly worth while.

The most common defect is probably lack of sufficient counter-balance, the next, almost equally prevalent, improper stroke and speed for the pump used, or its equivalent, the improper selection of the pump for the stroke and speed used. Since counterbalancing has been discussed so widely, this article will be confined to the second defect, including the subject of counterbalancing only as it affects the speed variation during the stroke.

Average stroke speed (revolutions per minute) is usually the only one to be measured. Speed variation during a single stroke is often more important in its effect on pumping. Then too, the rods are moving at a continually varying velocity, as is also the plunger. But plunger and rods do not necessarily move at the same velocity—in fact they usually are moving at different velocities, and in different phase relation. The length of stroke is usually important mainly as it affects one of these speed relations.

Extremely slow speed wells of approximately the same depth and loading, with mechanical equipment in good condition, have almost identical operating characteristics. Dynamometer cards from such wells always show the almost perfect parallelogram shape—the diagonal rod stretch line, the level fluid lifting line to the end of the up-stroke, the diagonal rod contraction line starting out the down-stroke which ends in the level rod-lowering line.

But take two wells with similar slow speed cards in the same field under the same operating conditions. Take cards from the two wells at 20 strokes per minute, and not in one time out of 10 will there be very much similarity between the higher speed cards in wells pumping under the usual field conditions. Yet the writer has seen cards from groups of wells, properly operated, in which there were many similar characteristics in most of the cards.

The differences that appear at higher speeds are only natural when we consider that inertia effects vary as the square of the speed. At 20 strokes per minute they are 16 times as great as they are at five strokes per minute. A 250-pound change due to inertia effects at five strokes per minute in a rod loading of 8000 pounds may be hardly

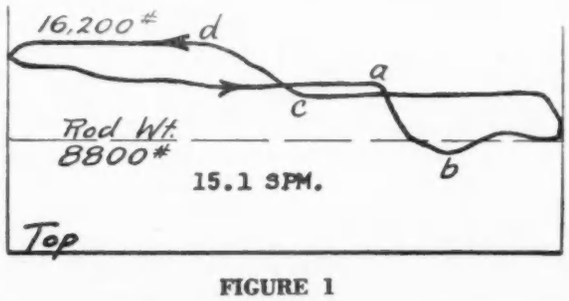


FIGURE 1

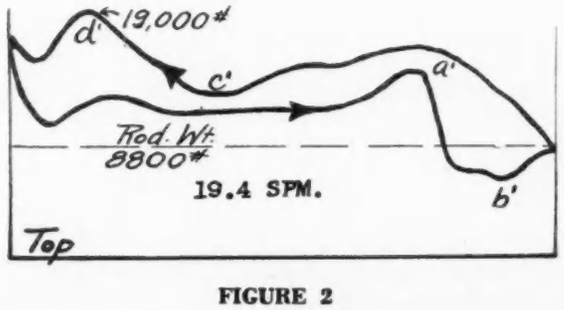


FIGURE 2

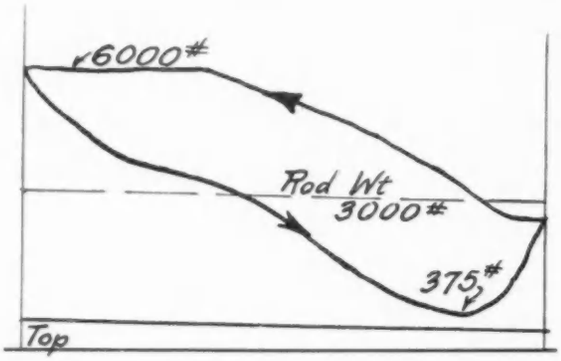


FIGURE 3

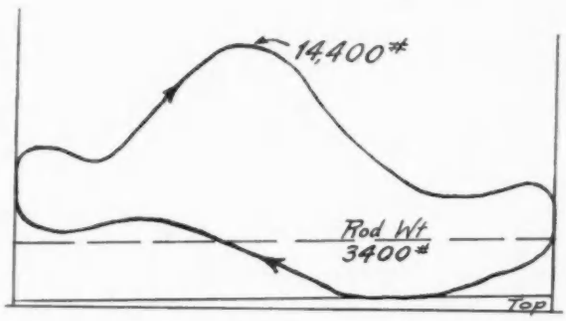


FIGURE 4

noticeable, and certainly not distinguishable from a 150-pound inertia effect on the five strokes per minute card from the similar well. But at 20 strokes per minute the same conditions producing this 250-pound inertia effect at five strokes will produce a 400-pound effect—a 50 per cent change in rod loading. In the other well, the 150-pound inertia load similarly becomes 3000 pounds. This 1000-pounds difference is readily apparent in the two dynamometer cards.

But this is not the only change. This 1000-pound difference in load between the two wells will change other operating characteristics. If the pumps are set at 5000 feet, using three fourth-inch rods, this 1000-pound load difference between the two wells will make a difference in rod stretch of almost five inches. If this inertia loading is effective at or near the ends of the stroke, and such a load usually is, there will therefore be a change of five inches in the plunger stroke of one well relative to the other. If the plunger stroke in one is, say 30 inches, the other will be pumping 17 per cent more or less fluid as the case may be. Such a variation in pumping load will produce still further differences, changing the whole stroke and load relation, and an entirely different card may result.

For example, take the cards shown in Figures 1 and 2. Figure 1 is a card taken from a well pumping at 6000 feet, 54-inch stroke, three quarter-inch rods, 1 15/16 plunger diameter, 20/50 motor, rotary crank balance, at 15.1 strokes per minute. The well was obviously hitting fluid on the down stroke—the inflow to the well was not sufficient to fill the pump barrel. Between *a* and *b* the load drops suddenly 5500 pounds—the inertia effect due to the sudden stopping of the plunger downstroke as it strikes the fluid.

Card No. 2 is taken from the same well immediately after the speed had been changed to 19.4 strokes per minute. Well conditions did not have time to change due to the higher speed. Between *a'* and *b'* of Figure 2 is seen a similar drop, but of 8500-pound magnitude. The values of these two inertia effects are in almost direct relation to each other as the squares of the respective speeds. This close check on the speed relation is only possible because both speeds are relatively slow, and the difference between the speeds is quite small. A much larger difference in speeds would destroy the similarity.

Rod load, horsepower, and efficiency comparisons cannot be fairly made on cards such as these. No pumper would allow his well to operate at the higher speed under such conditions. The fluid pounding could be felt and heard over the whole rig at each stroke. At the slower speed, the pound was not noticeable on the derrick floor but could be felt at the rod. The writer has, however, tested many wells which he found to be normally operating under worse conditions than that shown in Figure 1. These cards are shown merely to illustrate the relation of speed to loadings. The great difference caused by a speed change of less than 30 per cent is apparent.

Another fact shown by these two cards might be called to attention. In each card the load drop caused by the rods hitting fluid, is the cause of a corresponding sudden rise in load during the upstroke when the slack comes out of the rod string. See at *c* to *d* and *c'* to *d'* respectively. The relation of the speeds to the amount of this load increase is almost the same as in the case of the downstroke load drop. Maximum loads are noted on the cards.

We have seen what a high average speed can do in changing loads. In Figure 3 is shown a card from a considerably underbalanced well, pumping at 18.1 strokes per minute, 24-inch stroke, 2100 feet, three quarter-inch rods, 2¼-inch diameter plunger, pumping 13° A.P.I. oil. Owing to the underbalance, the speed kept increasing during most of the downstroke. At center stroke the rods were moving down at the top faster than the plunger below could move under its own weight through the heavy oil. Consequently the rods were buckling to the extent of the difference between 3000 pounds and 375 pounds. The up-stroke, on the other hand has all the characteristics of the ideal parallelogram card. Speed observations indicated that the down-stroke was actually being made at a velocity corresponding to 23-25 strokes per minute at a little past center stroke while the upstroke during the actual lifting of fluid was at a 12-15 stroke rate.

Dynamometer cards from many wells show that in the great majority of cases pumping irregularities are due to improper downstroke speed conditions. There is no power available to push the rods down, we must depend upon free fall under gravity. For best operation, it is obvious that every portion of the rods and the plunger should be dropping together at the same speed. Then there will be no buckling, and the plunger will make its complete downstroke. Owing to the stretch in the rods and the general flexibility of the system, some latitude can be allowed in this respect. In fact it is the usual case that the plunger is dropping more slowly than the rods during the first part of the stroke and faster during the latter part. Within certain limits and under certain con-

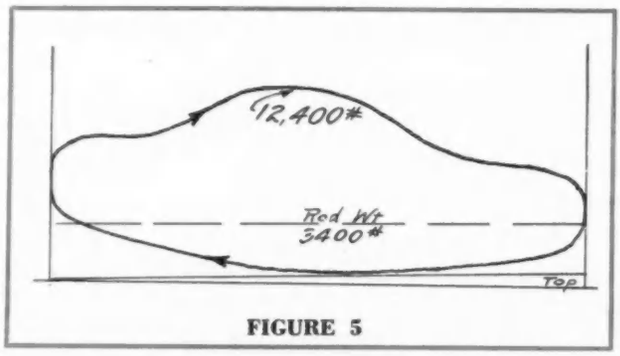


FIGURE 5

Listen Brother

...IT'S JUST TOO BAD FOR THOSE GUYS OVER THERE

I've been around these Texas fields a lot and when I see anything but a string of Reading Puddled Iron Sucker Rods going into one of these tough holes, I know it's just too bad for the lads on the job—and too bad for the expense sheet.

Take a tip from me, if *you* have to go on the pump, and it looks as though we all would, use Reading Puddled Iron Sucker Rods and prevent shutdowns.

A FEW SERVICE RECORDS OF READING PUDDLED IRON SUCKER RODS. WRITE US FOR QUOTATIONS ON RODS THAT PERFORM LIKE THIS.

STRING NO. 1

194 days' service, no rod breaks yet—2200 foot well. Rods of other metals broke 37 times in 189 days.

STRING NO. 2

174 days' service and no rod breaks — replaced rods of another metal which had 21 breaks in 140 days.

STRING NO. 3

Seven different sizes or kinds of rods showed 171 breaks in 292 days. Reading Puddled Iron Rods had 10 breaks in 430 days.

STRING NO. 4

Reading Puddled Iron Sucker Rods at last report had gone 115 days without breaks, or other trouble and were still in service.

STRING NO. 5

In a 4300 footer—10 breaks in 8 months, still in service 4 months later with no more breaks reported.

Write or Wire Us for Quotations

READING IRON COMPANY, Philadelphia

READING

PUDDLED IRON SUCKER RODS

Science and Invention Have Never Found a Satisfactory Substitute for Genuine Puddled Iron

ditions it is not particularly objectionable that this should be the case. It depends largely on how smoothly the plunger moves in its downward travel. But there must be no slack in the rods at the start of the up-stroke. Otherwise, high peak loads and a loss in efficiency is bound to occur.

Any factor that interferes with the free fall of the plunger will prevent smooth operation of the pump. Highest efficiency is obtained when the operation is smooth. The loss due to vibration, slack rods, lost stroke, and whipping often will reach more than 50 per cent of the total power consumption. Elimination of these defects then is desirable from the power standpoint alone, but it is even more desirable from the angle of maintenance costs. We may again cite an example used before of a well which required pulling and replacements every two weeks. A dynamometer test showed the stroke and speed to be excessive. After the change was made according to test recommendations, six and eight months go by without a pulling job.

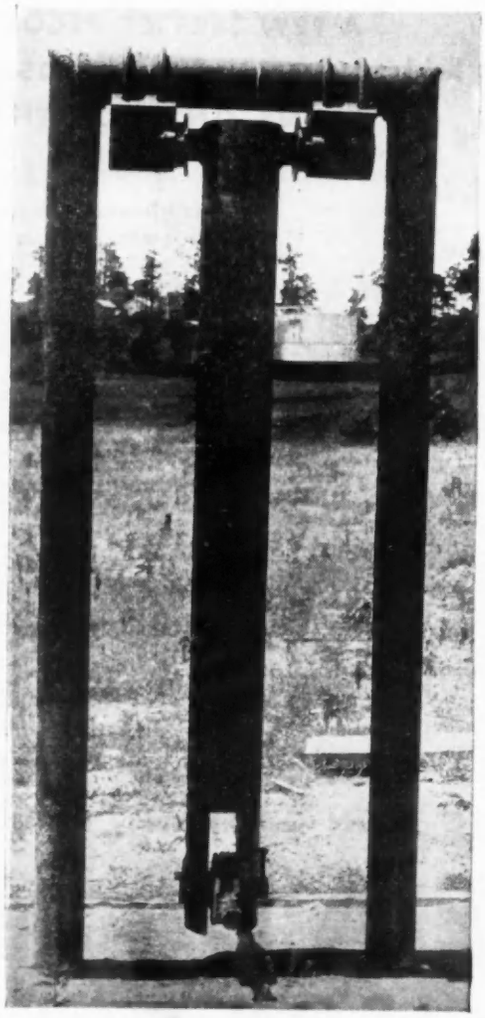
Plunger Drop

How fast can the plunger drop? If it moved free of the barrel wall, and in a vacuum instead of in fluid, it could drop eight feet in one second, allowing for equivalent deceleration during the latter half of the downstroke. This would correspond to 30 eight-foot strokes per minute as an absolute limit. How much this must be reduced for actual well conditions is something which can only be determined by test.

Many things control this speed of fall of the plunger. Either a cup or steel plunger that is tight in the barrel will drop slowly. A large diameter plunger will drop faster than a smaller diameter one. The larger the working valve opening with respect to the plunger displacement area, the faster the drop. Viscosity of fluid makes a big difference—the fall is much faster in water than in oil, and faster in light oil than in heavy. A long plunger, free in the barrel, will drop faster than a shorter one, owing to the greater weight directly applied to overcome fluid friction through the valves.

The plunger must always have time during the downstroke of the rods to drop its full stroke. The distance the plunger drops determines the length of plunger stroke. A loss in this drop means a corresponding loss in efficiency, for the well motion is carrying through the complete stroke and the power losses are present for the full stroke. It is here that many large power losses occur.

Figure 4 shows a dynamometer card from a 2300-foot well lifting over 1850 barrels of fluid per day at 29-72 inch stroke per minute. Notice that shortly after the down stroke begins, the rod load becomes zero. The rods buckle, and then increase their speed, but the plunger does not get a chance to complete its full stroke as shown by the slack at the beginning of the up-stroke and the high peak load.



Grease packed swing type hold up and hold down on Sun Oil Company lease in East Texas. Made by American Manufacturing Company of Texas.

The engineer in charge of this test, rightly judging that the trouble lay in the down-stroke conditions, increased the counterbalance considerably above that shown to be correct. This, of course had just the opposite effect of that shown in Figure 3. The speed of the down-stroke was decreased, giving more time for the plunger to drop at the expense of the up-stroke. He then found it possible to increase the speed to **31 72-inch** strokes per minute, increasing production almost to 2000 barrels per day, and the peak load was **reduced 2000 pounds.**

Irregular down-stroke conditions are always visible on the dynamometer card and are usually the result of speed and stroke relations to either the free dropping speed of the plunger, or to the amount of fluid entering the well. Hitting fluid should not be tolerated—speed, stroke, and even the diameter of the pump are easily changed to correct such a condition. Changes in speed, stroke and balance will usually be possible to correspond to the plunger drop speed. Looser cups or a longer undersize steel plunger will increase the speed of drop.

As increasing the counterbalance, decreases the downstroke speed, it is usually necessary to increase the average speed by a revolution or two when a well is brought closer to correct counterbalance so as to obtain the same production. Conversely, when decreasing the balance, decrease the strokes per minute.

No one thing will do as much to lower total pumping costs as proper attention to speed, stroke and counterbalance. The length of stroke and balance affect speed just as much and sometimes more than their relation to the number of strokes per minute would indicate. There is no material investment involved in changing these factors within reasonable limits, so that the amount gained in efficiency is pure gain. In addition, reduction in maintenance costs, due to the elimination of buckling of the rods and the resulting breakage and unscrewing, as well as the reduction in pump and tubing wear is a big saving.

And it is the down-stroke that must be watched. The up-tsroke will in most cases take care of itself once the conditions causing the irregular down-stroke are removed.

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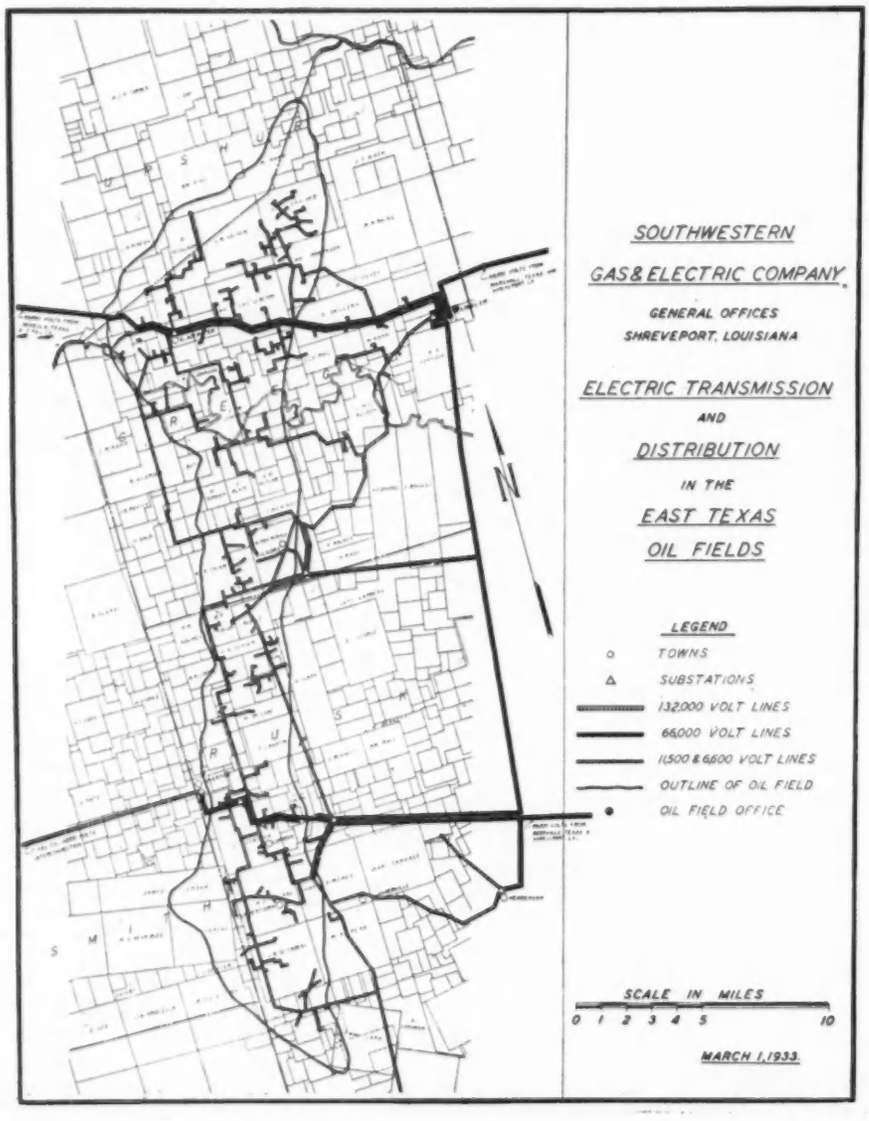
Electricity *for Oil Well Pumping* in East Texas

EDWIN VENNARD
General Commercial Manager,
Southwestern Gas & Electric Company

UNCERTAIN and changing conditions in the East Texas oil field make it difficult for operators to decide when the wells should be equipped for pumping. When the field was producing a million barrels of oil a day it seemed evident, with the rapid decline in bottom hole pressure, that pumping would be required within 90 days. The recent decrease in allowable has again changed conditions and it is not now known whether pumping will be required in three months, six months, or by next summer. Many oil operators will equip their wells this summer in order to avoid the added expense incurred in the winter. The possible difficulties of securing prompt shipment of equipment in case most of the 10,000 wells are equipped within a short period, also make it advisable for companies to install pumping units before the rush. Uncertainties, as the result of federal control, also add to the oil companies' problems.

These uncertainties, coupled with the general conditions in the oil industry, make it imperative that the oil companies exercise unusual care in the selection of pumping equipment and in the form of power to be used.

It is the purpose of this article to discuss the adaptability and application of electric power for handling East Texas pumping and to answer some of the questions usually asked by executives, engineers and operators.



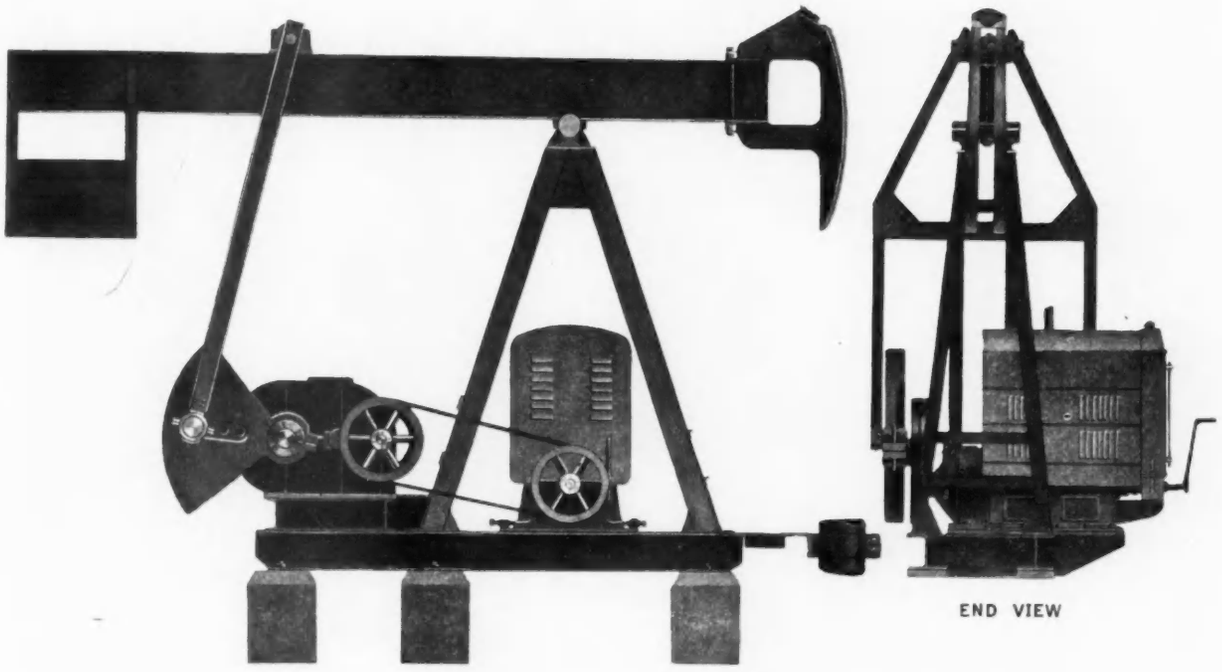
Most Oil Companies Want to Purchase Power

When the oil industry purchases power it transfers the power problems to the power companies, where these problems belong. The oil operators are relieved of the care, worry, thought and effort necessary in the production of power.

In view of these conditions, and in view of the general convenience, cleanliness, and flexibility of electric power, most oil companies prefer to use electric service if it can be used economically. Present economic conditions make it important that oil operators give considerable thought to operating costs; therefore, electric service must be competitive with other forms of power. In making the comparisons, however, all of the costs incidental to each form of power should be taken into consideration.

Continuity of Service

When the daily allowable can be produced in a few hours, shut-down time is not a great factor. It is generally believed, however, during an appreciable part of the life of the field the wells will require pumping 24 hours of the day. For efficient operation under these conditions operators demand as near 100 per cent service as possible. To provide this class of service a network of transmission and distribution lines feed the field from many directions. The accompanying map shows the transmission and distribution system in the field. There is available a total capacity of 74,500 kilowatts (100,000 horse power) in power plants and interconnections, this being sufficient for all present and future requirements in the field. Two major high voltage transmission



END VIEW

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A NEW PUMPING UNIT

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Here's the New PIW Pumping Unit. It is simple, compact, self-contained and highly rigid. An ideal unit for both shallow and deep fields. Easily portable and quickly installed on existing derrick floor, with special clamps for casing to keep unit in proper alignment.

Can be operated with Gas, Gasoline, Crude Oil Engine, or Electric Power.

No moving of unit or walking beam, nor disconnecting of pitman, for rod or tubing job.

Provides perfect accuracy in counterbalancing through counterweighted cranks and adjustable beam weights.

Every moving part properly protected by closed bearings and perfect lubrication. The unit is built of the finest available material by a manufacturer that has served the oil industry for 40 years.

Operators who have wells going on the beam will profit by investigating the advantageous features of the PIW Unit. Detailed information is yours for the asking.

●

THE PETROLEUM IRON WORKS CO.

● ●

Beaumont **Houston**

Louis Allis 15-horsepower electric motor pulling individual well unit in the Kilgore area.

lines feed into the field from the east, one in the northern part of the field and one in the southern part. In like manner, similar lines are connected to the field from the west side. In case of a catastrophe on the east side of the field the entire load could be carried from the west, and vice versa.

With such interconnections there has been no major interruption in the field since it was discovered.

A number of substations throughout the field transform the voltage from 66,000 volts (high pressure) to the 11,500 volt (intermediate pressure) distribution. These distribution lines form a network throughout the field. There is service available on practically every lease and in a manner providing service from a number of different directions. If a difficulty is encountered on one distribution line, service can be obtained through another without an interruption in service to the oil company.

Low Initial Cost

East Texas producers have already made heavy investments in leases, wells, rods, tubing, and other fundamental requirements. The fixed charges on this heavy investment are often very burdensome. When the time arrives to consider the type of pumping rig and type of power to use the companies consider the first cost a major factor. The electric motor has the lowest cost per horsepower of any class of unit, and, because of its light weight and ease of handling, can be installed with a minimum expense.

Low Operating Costs

When all factors are taken into consideration, the total over-all operating cost of the lease with electric pumping wells operated with purchased electric power is less than the lease operated with other forms of power.

Rates

The various rates available in the field are designed to meet the needs and desires of any particular customer. If desirable, the electric company will furnish all transformers and any standard service voltage required. For those oil companies having a relatively high operating load factor[1] there is a form of rate which gives the benefit of low unit cost to such operators. If, because of the peculiar conditions in the field, the oil company is not able to operate at a high load factor, there is another form of rate based on the use of energy only, which is beneficial to the consumer under these conditions.

Other companies prefer to own the transformers and distribution lines on the lease and thereby benefit by having all service pass through a single meter.

Group Billing

In cases where the company owns the transformers and distribution lines on various leases and different locations, the company will set a number of different meters to measure the power and energy delivered to each lease. In determining the power bill, all of the energy used on the various leases will be added together and one bill rendered. This is equivalent to having all of the energy pass through a single meter although the leases may be scattered over a wide area.

In cases where the customer elects to be billed on the demand-energy rates (beneficial to customers having a rela-

[1]The term "load factor" as used in this article means the ratio of actual energy used during the month divided by that amount of energy which would have been used if the peak load in kilowatt demand had operated 720 hours.

BREAKING RECORDS

—is all part of the day's work to this "RING" TYPE PACKER

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tively high load factor) the demand charge is based on what is termed the "maximum simultaneous demand." This represents the maximum capacity in kilowatts (horsepower) required by the oil company during any particular 15-minute period during the month. For instance, an oil company may have 50 horsepower on one lease, 50 horsepower on another, and 50 on a third lease. The sum of all three of these would be 150 horsepower and if the demand charge were based on the sum of all the peaks this would be 150 horsepower. In all probability, however, these leases can be operated during different hours of the day so that the maximum amount operating during any one period is only 50 horsepower. In determining the demand charge the utility takes this factor into consideration and in this case would base the demand charge on 50 horsepower.

In the past there has been some objection toward demand charges on the part of the oil industry. These objections have been overcome by this maximum simultaneous demand billing method, necessary because of the peculiar conditions in the East Texas field. The utility has demand-energy rates which are optional with the customer, because only through this form of schedules can benefit be given for high load factor operations. The oil industry is one which has inherently a high load factor and should receive the resulting benefits from the electric utility. For this reason this form of rate is particularly adapted to the oil industry. On this form of rate the unit cost decreases as the operating load factor increases.

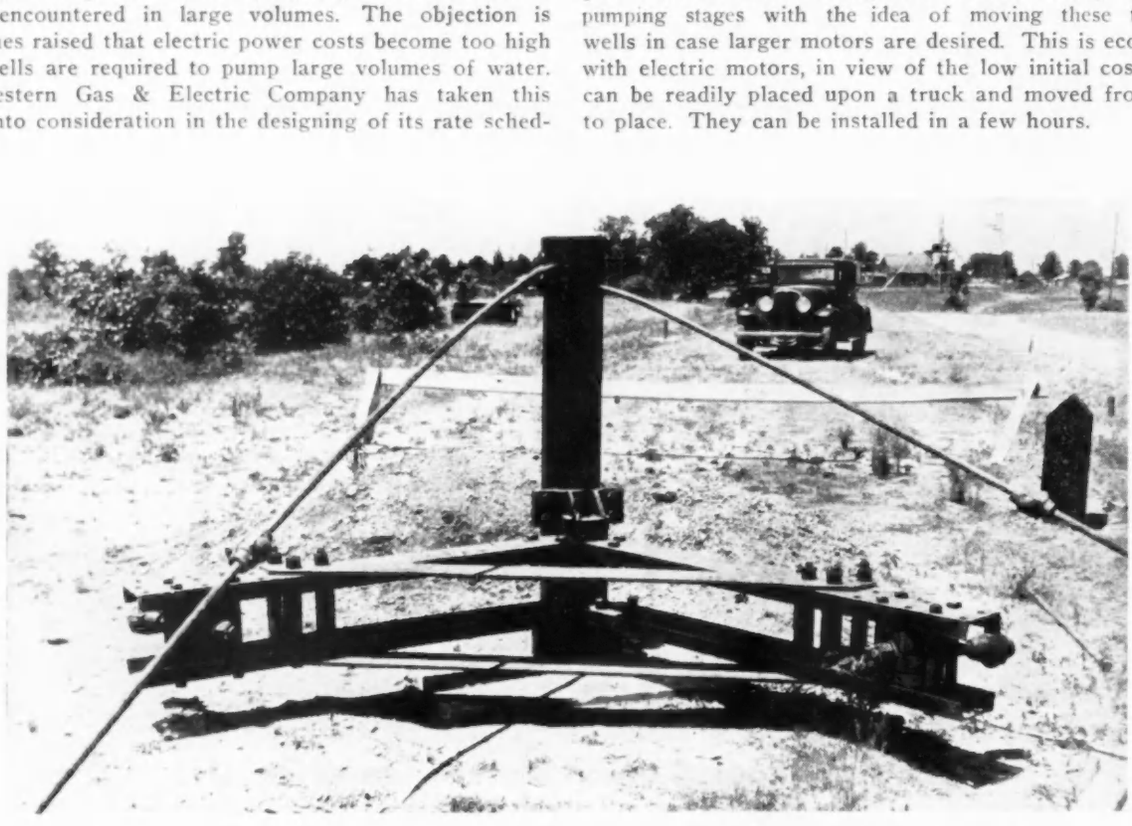
Electric Unit Costs Continue Downward

Many companies believe that electric power has a decided advantage during the early pumping stages when salt water is not encountered in large volumes. The objection is sometimes raised that electric power costs become too high when wells are required to pump large volumes of water. Southwestern Gas & Electric Company has taken this factor into consideration in the designing of its rate schedules, in that the unit cost continues downward as the load increases. In other words when large volumes of salt water are pumped the power requirements will be greater. When the power requirements are greater, the electric rates are lower, thereby offsetting (to some extent) this added cost to the oil industry in lifting water. It is believed that the unit costs of electric power are sufficiently low to enable the companies to continue the purchase of electric power even under these conditions of large volumes of power.

Flexibility

Electric power is adaptable to any and all operations of the oil industry, for the smallest motor and for the largest. It is immediately available upon the pressing of a button or the throwing of a switch, regardless of temperature and regardless of weather conditions. The service is now available on practically every lease or can be made so upon one day's notice.

In view of the uncertainties and changes in conditions it is difficult for the oil companies to determine the size horsepower engine or horsepower motor to install on the well. Under present conditions five horsepower may be sufficient. The wells may later require 15 or 20 horsepower. The use of electric power enables meeting these uncertainties with a minimum investment. Motors are available with double and triple ratings at a cost only slightly above a unit motor of the maximum rated horsepower. In other words, a single motor can be obtained which will operate as a five-horsepower motor, or a nine horsepower motor, or a 16-horsepower motor, each with high efficiency. Other sizes may be secured if desired. Some companies prefer to install 10-horsepower motors during the early pumping stages with the idea of moving these to other wells in case larger motors are desired. This is economical with electric motors, in view of the low initial cost. They can be readily placed upon a truck and moved from place to place. They can be installed in a few hours.



Sun Oil Company, Selman lease. Ninety degree Oilbath swing in which bearings are in oil bath and weatherproof and are equipped with 1½-inch upset pull-rod connections to use with combination turtle back shown in the illustration. Stroke can be changed by adjusting pull-rod bearings. Variation in stroke is approximately 15 per cent increase or decrease from central position. This equipment made by American Manufacturing Company of Texas.

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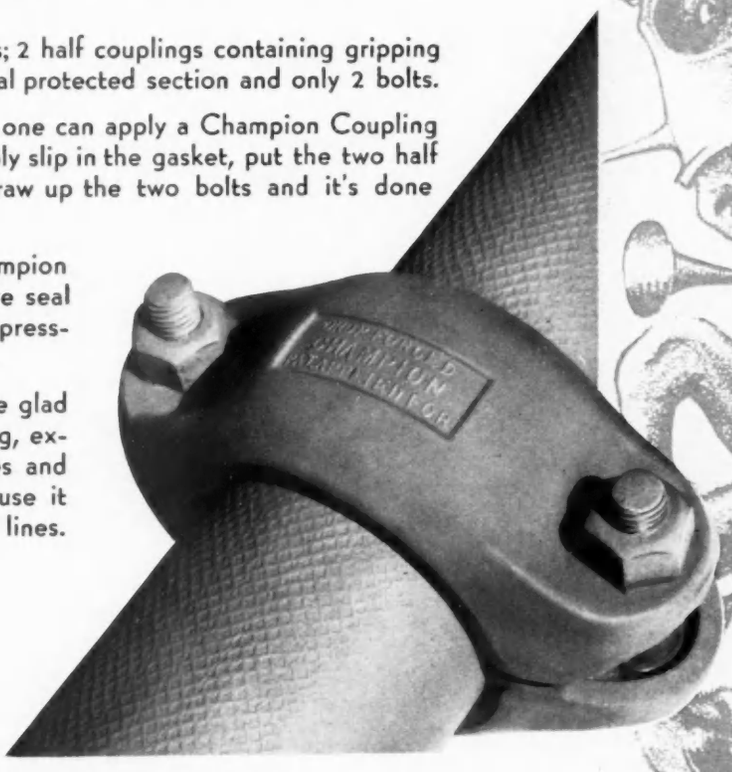
Our representative will be glad to show you this coupling, explain its exclusive features and show you how you can use it profitably in laying your lines.



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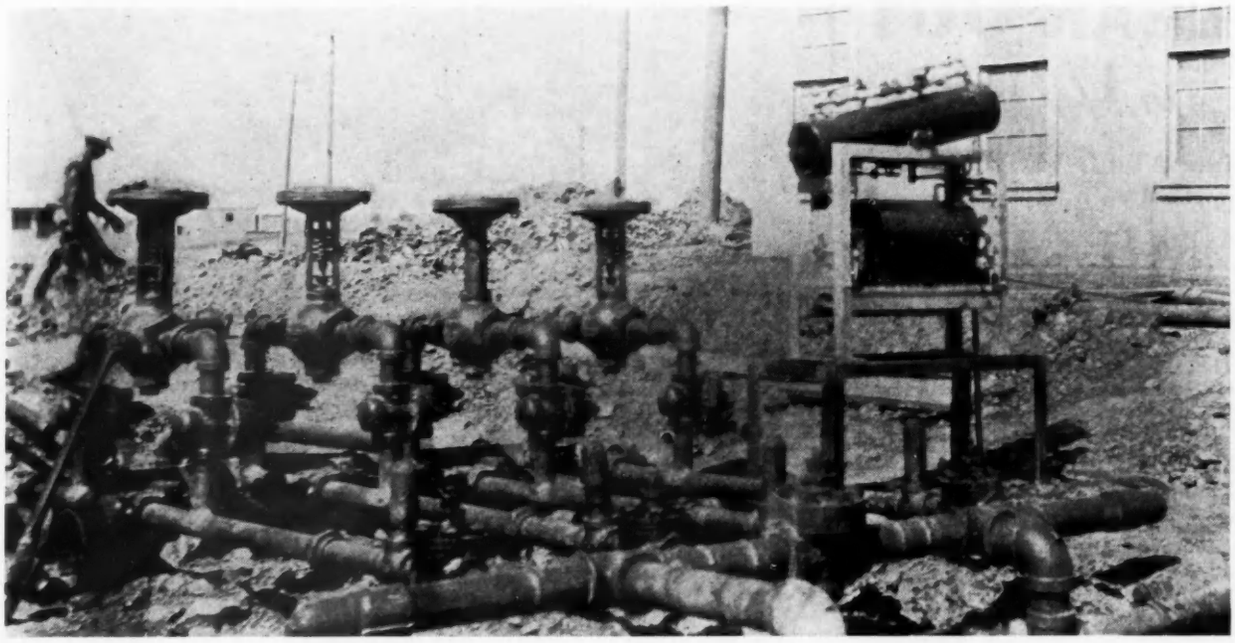


National Tank Company Intermitter on a group of wells at Seminole.

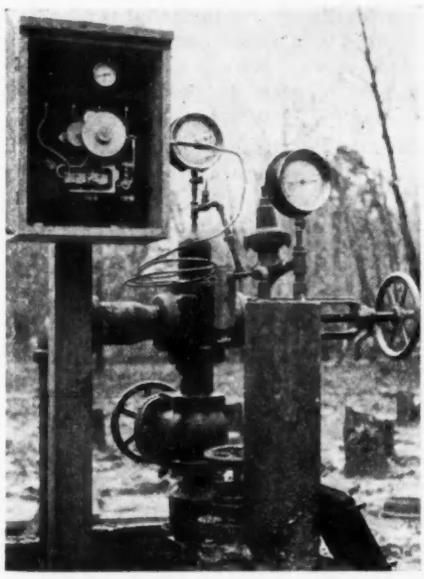
ECONOMY AND NOT QUICK RECOVERY

Application of Air and Gas Lift To East Texas

S. F. SHAW
Consulting Engineer

APPLICATION of the air or gas lift to the East Texas field would serve a much different purpose than that for which installations were made in the Seminole, Santa Fe Springs and other flush or semi-flush fields. In these pools, particularly at Seminole, the gas-lift was installed primarily to speed up production, and the idea has seemed to gain headway that large expensive plants for handling large production always accompany the installation of the gas lift. Nothing need be farther from the facts than this impression, and the installations of air or gas lifts that are made in the East Texas field in the immediate future will be primarily for the purpose of reducing to a minimum the installation cost per well for lifting equipment, and also for reducing lifting costs to a minimum.

It is not likely that the East Texas field will be produced at maximum capacity for a long time to come, therefore, plant installations must be made with the idea of handling a small production. It is one of the purposes of this article to bring out just what can be achieved in that direction, and to indicate in what way the expenditure for installation can be based directly on the production to be lifted.



Taylor Intermitter on well in East Texas field.

Types of Air-Gas Lift Operation

The phases of air- or gas-lift operation that might be applied in the East Texas field are as follows:

1. Continuous flow.
   - (a) Through small tubing during the entire 24 hours.
   - (b) Through large tubing or through the casing for a portion of the day, or for a portion of the month until the allowable for the day or month is completed.
2. Intermittent flow without chamber.
   - (A) Through tubing.
     - (a) With tubing suspended high in the well.
     - (b) With tubing suspended low, using "kick-off" valves to reduce the starting pressure.
   - (B) Through the casing.
3. Intermittent flow with chamber on the lower end of the tubing.

Wells are caused to flow naturally by reason of the pressure that exists in

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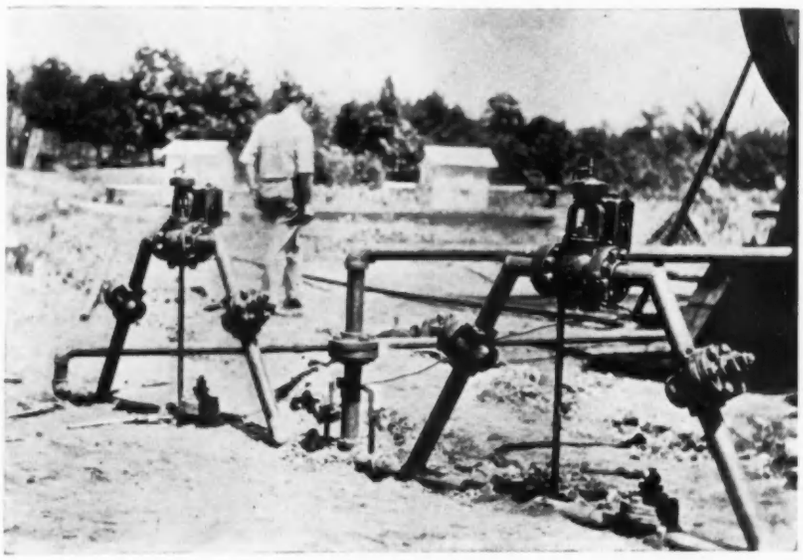

A well at Seminole provided with a Jat admission and discharge magnetic valve.

the oil reservoir, and by the gas that is associated with the oil in the reservoir. If the pressure is sufficiently high the well will flow without the need of any gas, similar to the action of an artesian water well. If there be sufficient gas present with the oil, the well will flow naturally even though the pressure be very low. If, however, both pressure and quantity of gas are reduced below the quantity necessary to lift the oil to the surface, the well will cease flowing even though there be mixed with the oil almost sufficient natural gas to lift it to the surface.

The lifting of oil by the air- or gas-lift is an action that is exactly like that of natural flow, except that whatever gas that is lacking in the oil is admitted to the well from compressors, or in some cases, from gas wells.

The oil can be lifted by gas-lift through a small tubing or through the casing. It can be produced by gas-lift at a low daily rate or at a high daily rate. It can be produced continuously, that is, in a stream that is a steady flow, or can be produced at intervals ranging from a minute to several hours apart. When the oil is produced at intervals, it is known as intermittent flow. Although the oil can be produced in any of the ways mentioned, it is necessary to observe certain rules that guide each type of flow if the producer desires to reduce installation expenditures to a minimum, to obtain the minimum operating costs, and in general to secure the best results. It will, therefore, be well to understand the conditions which affect the various phases of gas-lift methods employed in flowing the wells.

If the maximum daily quantity of oil is to be produced, it is necessary that the flow string be sufficiently large in diameter to permit this quantity to be lifted. Continuous flow has usually been employed for lifting the maximum flow, and for such a purpose during the period of flush production, the flow string should usually be as large as possible. In East Texas, however, the problem is not that of lifting the maximum daily quantity, but to produce a restricted quantity, and the method should be such that the operating costs be held at the lowest possible figure. If continuous flow were to be employed in East Texas, owing to the small quantity to be produced per day, that is, 40 to 50 barrels, it would be necessary to flow the oil through a very small tubing. In many fields it would be of advantage to flow the oil continuously through a small flow string, but in East Texas the character of the oil is such as to cause a small tubing to become choked with paraffin, consequently serious trouble would result unless the extraneous gas admitted to the well were heated before it entered the well. Paraffin conditions are much worse in some of the oil fields in Roumania than in East Texas, and troubles were overcome by heating the gas before it entered the well. The oil produced in the Cat Canyon field, California, is so heavy and viscous that it is practically impossible to use the pump, and therefore, the oil is lifted by gas admitted to the well, to which a small amount of distillate is added each day.[1] Still another method of over-

[1]Brad Mills, "Injection of Distillate Helps Gas Lift on Heavy Oil." Oil Weekly, September 19, 1930, p. 43.

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coming paraffin troubles is to run a paraffin knife as has been done in the Texas Panhandle and in Roumania, although this method requires that a hoist be installed at the well.[2]

Continuous flow through the casing could be conducted for a sufficient time each day by gas-lift until the allowed production is lifted, after which the wells could be shut down until it be desired to produce them again. It is probable that there would be little trouble with paraffin in East Texas if the wells were produced in this manner.

In starting wells which have high fluid levels on gas-lift, especially if they be flowed through the tubing, it is frequently the case that high pressures are encountered, owing to the displacement into the inner tubing of a large quantity of oil that is in the casing. For such conditions it has been found in the Government Wells field, Texas, and in the Oklahoma City field, that the use of starting valves is of advantage in enabling the wells to be started at a low pressure. These valves are inserted in the collar of the tubing at sufficient intervals apart that after the oil above one collar has been flowed out, the compressed gas can reach down to the next succeeding valve, until that gas has finally reached the bottom of the tubing.

[2]E. O. Bennett and K. C. Sclater, "Some New Aspects of the Gas Lift," Trans. A.I.M.E., Pet. Dev. & Tech., 1927, p. 124.

Intermitting Apparatus

In intermittent flow, the intervals can be controlled by manual operation of valves, or by mechanical intermitters. Manual operation of valves could be employed in East Texas for a time, at least if the admission valves were situated close to the compressor plant. This would mean a greater consumption of compressed air or gas if there were long lines extending from the plant to the well. Admission valves could be placed at the wells if the operator could make the rounds of the group of wells connected with the plant in sufficient time, which would eliminate the greater consumption of gas due to the drainage of the line from the plant to the well.

Although mechanical intermitters have not reached the highest degree of perfection, they have been employed with fairly satisfactory results. Some of the intermitting mechanisms that have been in successful use are as follows:

Taylor Instrument Company intermitter, operated by clockwork.

National Tank Company intermitter, operated by compressed gas.

Jat intermitter, operated by electric motor.

Max-i-flo intermitter, operated by the fluid level in shallow wells, and by special tank flow control in deep wells.

Hughes Plunger Lift, in which a plunger rises and falls through the flow tubing, producing an intermittent flow.

Clockwork intermitters for individual wells have been installed on some of the wells in East Texas for operating wells naturally. In wells operated without a chamber at the lower end of the tubing these intermitters could be employed for flowing either through the tubing or through the casing.

The National Tank Company intermitter has been employed successfully for admitting compressed gas to wells either with or without the chamber at the lower end of the tubing. These intermitters are usually installed at a central point, and of a size that will operate 12 wells without the chamber, and six wells with the chamber on the tubing.

The Jat intermitter has been employed to a considerable extent in California fields and to some extent in Mid-Continent fields. The intermitter is stationed in a central position, and electric wires are run to the wells where are installed magnetic valves which admit and shut off the supply of compressed air or gas to the well. These

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The Ever-Ready Tubing Catcher gives you *this* protection. It reduces cost by *eliminating* anchor or excess pipe *below* the perforated pipe. This means less tubing to handle . . . perforated pipe is at the *correct* fluid level . . . no damage or danger should the tubing break. Pressure and fluid will not retard the running of the Ever-Ready Tubing Catcher. For *positive* protection, use the Ever-Ready Protector.

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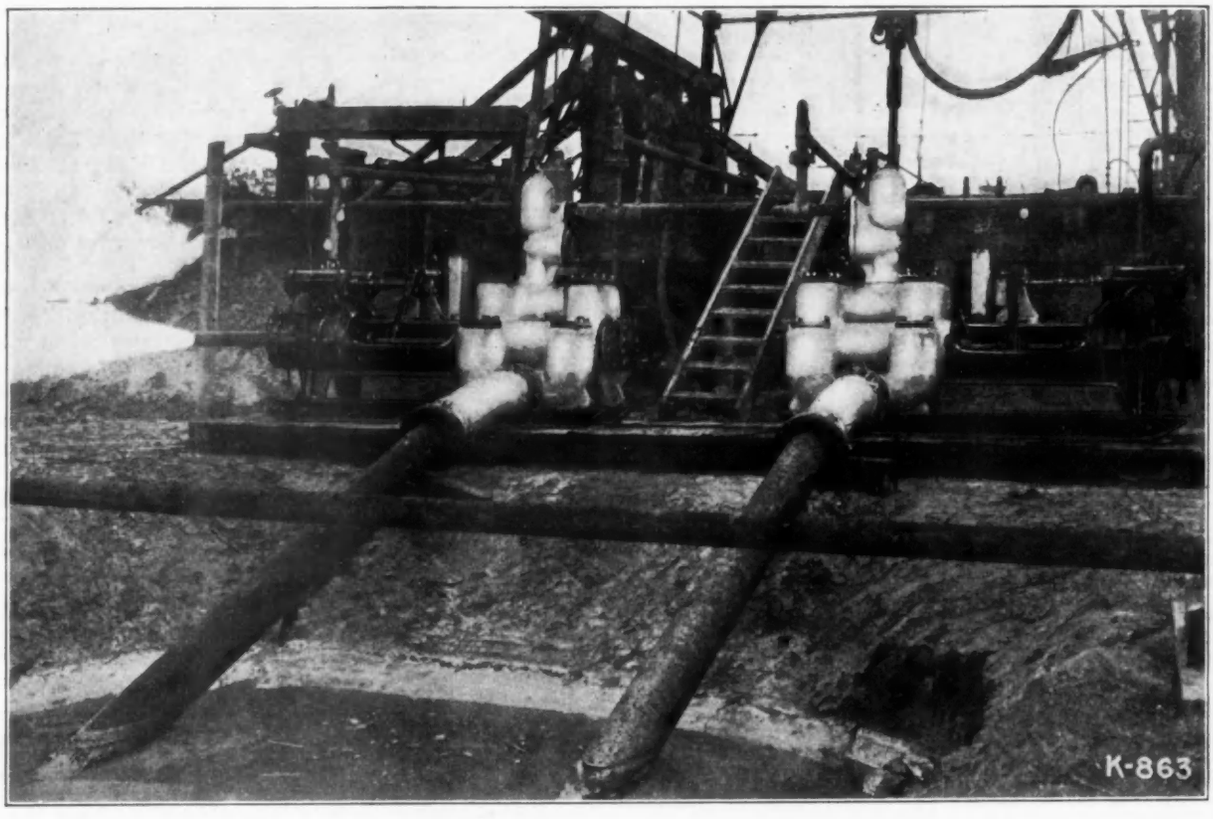

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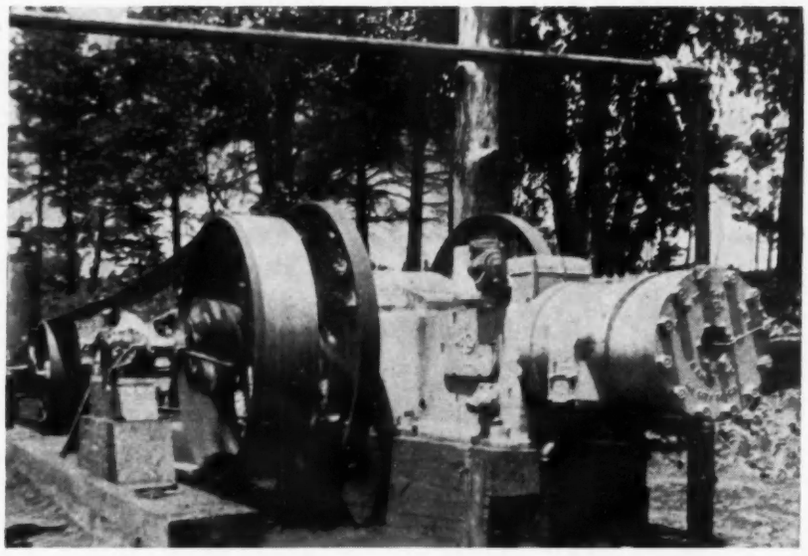

Type C two-cycle Reid Gas Engine (13¼ x 16-inch) used as prime mover on compressor air lift plant in East Texas, handling oil from shallow depth.

intermitters can be built to operate any practicable number of wells whether or not chambers are employed on the tubing.

The Max-i-flo intermitter is stationed one at each well. It can be employed with or without chambers, although the common usage has been in wells provided with chambers at the lower end of the tubing.

The Hughes Plunger Lift is a special form of intermitter which has been employed in several Mid-Continent fields and the Gulf Coast.

Types of Compressor Plants

Compressor plants to be employed in the East Texas field could be of the large or small unit type, either direct driven or belt driven by steam engine, electric motor, gas engine or oil engine. If the operator already owns any type of compressor plant and engine, his choice is likely to be guided by that consideration rather than any other condition.

If the operator owns a large number of wells and considers the possibility of extracting gasoline from the gas at some time in the future when gasoline extraction becomes profitable, he may prefer to install a central plant with the large type of direct-driven gas engine compressor, with units of 150 to 200 horsepower.

The smaller operator, owning a group of from five to 10 wells may consider it advisable to use small units, belt driven from electric motors, or from gas or oil engines. The installation cost of the electric motor-driven compressor is less than the other types, and the lease operations can be simplified to a greater degree. On the other hand, if gas or oil for fuel is available from the wells, free of charge, the operating cost is considerably reduced by employing gas engines, or oil engines. The gas engine usually has the preference over the oil engine unless it appears that there may be a shortage of gas for future operations.

The use of the steam compressor with its heavy consumption of fuel has been largely discarded for one of the other three types of power drive.

Installation and Operating Costs

In stallation costs in the East Texas field for a compressor plant of two small units capable of handling from 10 to 40 wells, each well producing 40 to 50 barrels per day, depending on conditions, would be approximately as follows:

Two compressors driven by electric motors, $10,000.

Two compressors driven by gas engines, $12,500.

Two compressors driven by oil engines, $18,000.

The installations cost per well would probably range between $500 and $1500, depending on the conditions of pressure in the wells, and on the type of compressor plant selected.

Operating costs, including depreciation of the plant on basis of three years, and charging interest at eight per cent, would range from about five cents per barrel lifted to 11 cents.

Troubles Encountered When Using the Gas Lift

In employing the gas lift for raising oil, a question of much importance is that of water encroachment. If acidulous water should be lifted with the

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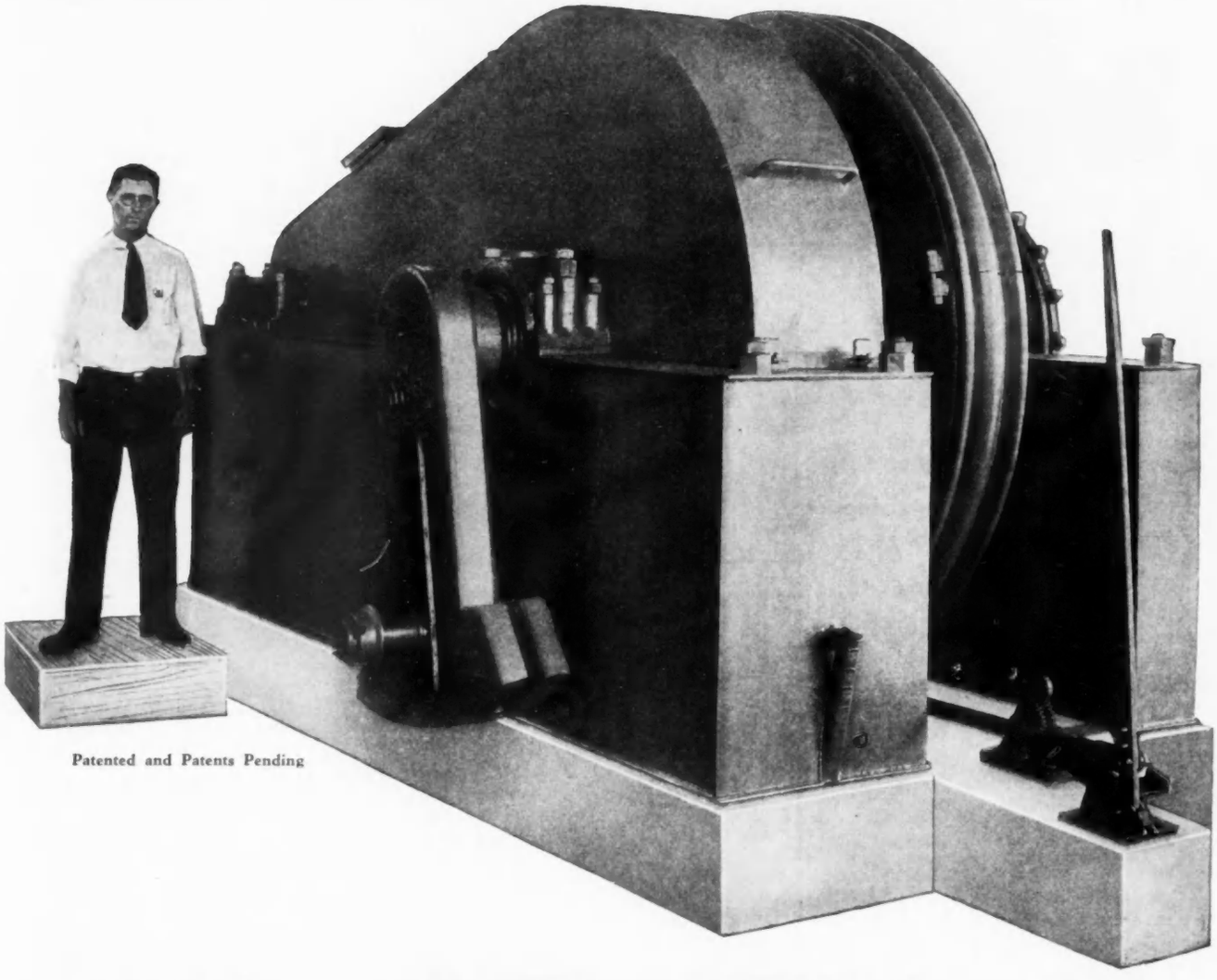

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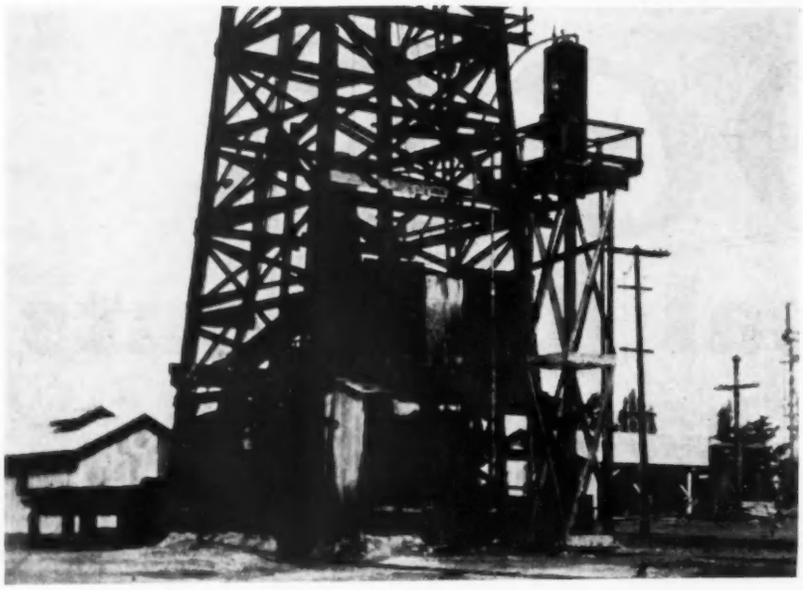


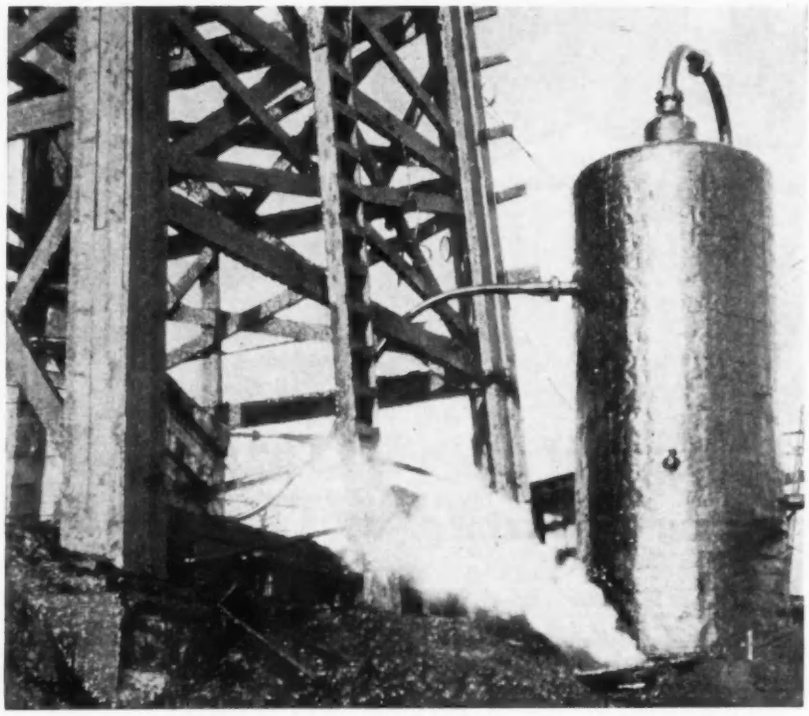
Flow through tubing on a well operated at a low production rate in the Santa Fe Springs field, California.

oil, it might be found that the corrosive action on the tubing and casing would be serious. Wrought-iron tubing could be employed where the water is not acidulous to a serious extent, and galvanized wrought-iron tubing could be employed if the water contained a greater degree of acidity. In some fields it has been found that water encroachment increases emulsion troubles when the gas lift is employed, to a greater extent than when the pump is employed. Nevertheless in many fields it has been found that the quantity of water to be lifted is too great for the pump to handle, thereby making it necessary to use the gas-lift and to accept the greater degree of troubles. In many fields where the gas-lift is employed, water encroachment has not caused corrosion troubles or added appreciably to emulsion troubles.

Effect of Gas-Lift on the Sand

There has been much misapprehension as to the effect of the gas-lift on the sand in that it is believed by some engineers that it has an injurious effect, and increases the gas-oil ratio. The action of the flow of oil into the well is controlled by the quantity of oil removed daily from the well, rather than by the method that is employed for producing the well, as has been pointed out by Hayward[3], and by the author[4]. Hayward states ". . . there is only one gas-oil ratio for any given rate of production and the method of production, or the type of equipment used, does not change this ratio." The author suggests "Actual comparisons on wells employing gas lifts followed by beam pumps have shown no appreciable difference in the gas-oil ratio when the well is being operated at the same capacity whether it be on the pump or on the lift. This is a logical result, since the production of a given quantity of oil whether by gas-lift or by the pump, will maintain the same fluid level, and the flow of oil and gas from the sand into the well is controlled by the liquid level rather than by the means employed in lifting the oil."

It has been shown by Lindsly[5] that the oil in the East Texas field is not saturated with gas at the initial pressure encountered in the reservoir, and that the gas does not begin to separate from the oil until the pressure is reduced to about 750 pounds gauge pressure. Lindsly finds that the quantity of gas initially dissolved in the oil is close to 370 cubic feet per barrel. It would appear, as pointed out by Hayward, that no matter by what method, or at what rate, the oil be produced in the East Texas field, there will be no change in the gas-oil ratio until the pressure at the bottom of the well has been reduced to approximately 750 pounds gauge pressure. It remains to be seen just what will be the action in this field when the reservoir pressure is reduced below 750 pounds. Possibly for a time the gas-oil ratio per barrel produced will tend to increase, although at this time it has not become evident whether such will be the case. At any rate it would appear that the gas-oil ratios will not differ for any given rate of production whether the wells be produced on the beam or on gas-lift.



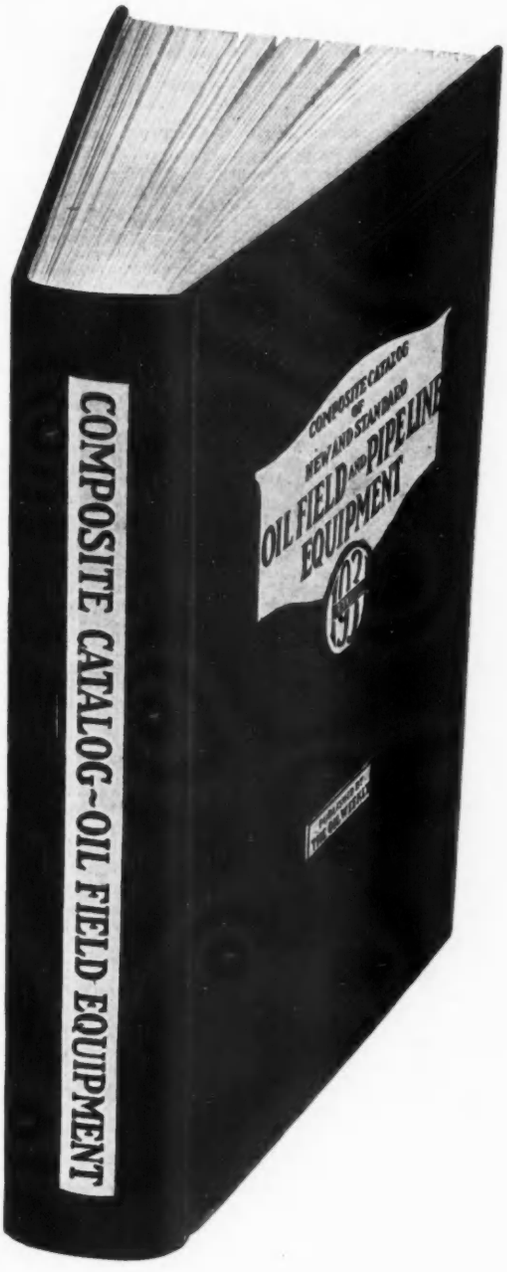
Separator insulated to overcome paraffin trouble in Roumanian gas lift system.

[3]J. T. Hayward, "Effects of Rate of Production and Producing Equipment upon Gas-Lift Ratios." Trans. A.I.M.E., Pet. Dev. & Tech. 1932, p. 370.

[4]S. F. Shaw, "Well Back Pressures and Fluid Levels." Paper read before the Mid-Continent Division of the American Petroleum Institute at Tulsa, Nov. 16, 1928.

[5]Ben E. Lindsly, "A Study of Bottom Hole Samples of East Texas Crude Oil" Paper read before the American Petroleum Institute, Tulsa, May 18, 1933.

Pumping Equipment IN THE COMPOSITE CATALOG



Descriptive matter on pumping equipment finds an important place in the 1932 edition of The Composite Catalog of Oil Field and Pipe Line Equipment, copy of which is either in the possession or immediately available to every person having to do with the selection of pumping equipment.

This descriptive matter runs from a 24 page section dealing with the pumping equipment of a leading manufacturer, down to a fraction of a page giving details on pumping equipment manufactured by other companies.

On the following pages will be found part of the classified index to the 1932 Edition of The Composite Catalog of Oil Field and Pipe Line Equipment, giving the companies represented therein, and the pages on which they either described their pumping equipment or accessories in full, or told where they could be bought.

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John A. Coleman 62
General Electric Company 82-85
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Charles N. Hough Mfg. Co. 252
Lucey Products Corp. 122-123
W. C. Norris 165
Norvell-Wilder Supply Co. 167-186
Pelican Well Tool & Supply Co. 200
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A. P. I. Specifications Are in the Composite Catalog

New Devices *Depart from Customary Methods* For Lifting Oil

WHILE manufacturers of engines, electric motors, pumping units, powers, jacks, rods, regular air-gas lifts, and other such customary well-pumping equipment have in the East Texas field an exceptionally large market for their products, that area will also constitute an important market place for various newly developed devices and equipment assemblies which employ new principles and ideas in the production of oil from wells no longer capable of flowing naturally.

Prominent among those out-of-the-ordinary types of equipment are various patented valves and stage-lifting devices, designed to aid the natural flow of wells, to re-start flow when it has ceased, or to prolong the flow, the devices involving utilization of natural gas from within the well in which it is installed, or from adjacent wells, or using natural gas or air introduced under pressure from compressors. Devices of this nature will be particularly applicable in East Texas (as in other fields) during the transition period when wells have declined in pressure so far as to cease to flow satisfactorily of their own accord but when artificial lifting of the oil can be delayed through more efficient utilization of the limited inherent flowing ability still remaining.

In addition to those devices designed for prolonging the flowing periods of wells, there are also various other out-of-the-ordinary devices and assemblies now available for producing oil from wells which have passed the flush period of natural flowing ability—oil lifting installations which depart from the customary pumping set-ups of prime mover, walking beam or jack, sucker rods, and pump. These installations are of various types and employ various principles, and are based in general on the idea that greater efficiency and economy may be attained through elimination of disadvantages inherent in the installations employed in the past.

Among these various devices and outfits which differ from customary pumping installations are some which have been used extensively in actual field operations, while some others are newer and more in the experimental stage; but in general they have proved sufficiently satisfactory or promising to convince petroleum engineers of their economic value or importance.

To aid in dissemination of information on these advanced oil-producing installations, there are presented herewith descriptions of some of them, together with explanations of how they operate. The described devices are divided into two groups indicated above: those in the first group involving utilization of gas or air pressure, while those in the second group are more closely related to customary mechanical pumping, although embodying important differences. Devices are described in the alphabetical order of the companies which make them.

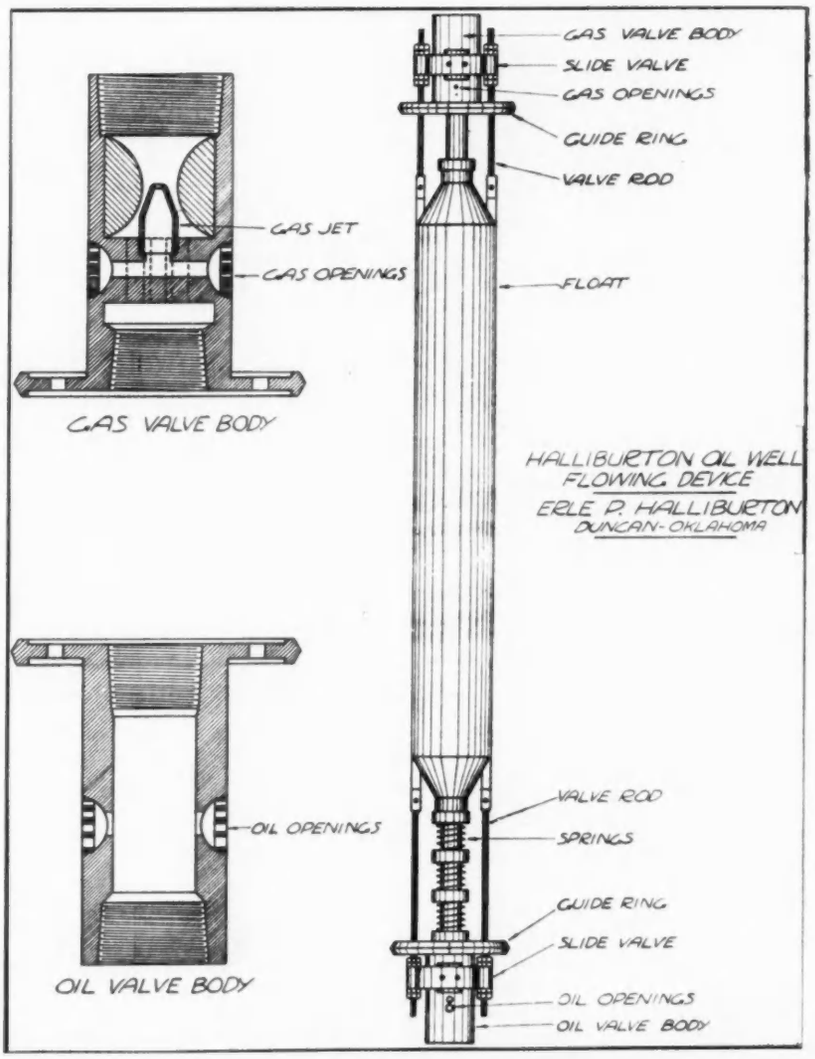
Flow Devices

Among the installations falling within the first group are the following:

Halliburton Oil Well Flowing Device

The Halliburton oil well flowing device, made by Halliburton Oil Well Cementing Company, Duncan, Oklahoma, consists essentially of two valves located near the lower end of the tubing and is operated by a float.

The device is run into the well on



Halliburton Oil Well Flowing Device

Try This New Deal

in

Stuffing Boxes

★

The **APEX** costs less per day . . . and besides gives the ultimate in Service!

The Conical Cover of the Apex, when turned, automatically adjusts the rubber packing from the sides, assuring longer life than can be had from the common form of stuffing box packing.

A flexible joint, between the tubing connection and the stuffing box body, allows the box at all times to conform to the side motion of the polished rod. This assures perfect alignment and gives longer life to the packing rubbers.

Get the facts—Learn what other operators think of Apex Stuffing Boxes. Write—

The OIL WELL IMPROVEMENTS CO.

TULSA, OKLAHOMA

the tubing to a point adjacent to the producing sand. Some type of casing head is used to pack off between the casing and tubing.

The float that actuates the valve is constructed of seamless tubing and is supported on a spring to increase its buoyancy. When the float is clear of the liquid the valves are closed, but as the liquid level rises the float also rises, opening both valves.

The lower valve is submerged in the liquid and the upper valve being out of the liquid admits the gas.

In addition to this there are two guide rings, one near the top and one near the bottom, to keep the float from rubbing on the casing.

Operation of Device

To explain the operation of the device, assume it has been run into the well on a string of tubing with a short closed anchor on the bottom to keep it close to the producing sand. The casing head packed off and pressure allowed to build up in the casing.

If the fluid partially fills the well bore the float rises as the device is let into the well allowing the tubing to fill up to the same level as that in the casing with dead oil. When the tubing is swabbed or pumped out, fresh live oil is admitted into the tubing through the valves, that is oil in combination with gas and the hydrostatic head of such a column is less than if it was solid fluid. If the well has even a reasonable amount of bottom hole pressure the column of fluid is forced out through the top of the tubing. This flow when once started continues until the column of fluid in the well holds the float and valves at such a height that the well just flows the oil as it comes out of the sand at a constant rate.

The lower valve is always submerged in the oil and, therefore, only oil or gas in solution enters at this point. The upper valve being above the liquid level admits gas into a Venturi tube, mixing the gas with the oil or liquid and lightening the weight of the column thereby requires less pressure to cause it to flow.

It is believed that a large per cent of the gas contained in the oil sand is probably in a liquid state while under pressure and only a small amount of expansion takes place until the liquid gas enters the valve with the oil and is allowed to expand there, where it does the greatest amount of good in raising the column. The level of the oil or other liquid is maintained at such a height in the casing that it keeps the

LARKIN PACKERS

OVER THIRTY YEARS EXPERIENCE on the part of the Larkin Packer Company is back of Larkin Packers; experience in manufacturing packers of every type for every purpose, including the large gas wells in the East as well as in the West.

OIL OPERATORS THE OIL COUNTRY OVER COMMEND THE SUPERIOR QUALITY OF RUBBER USED AND THE HIGH GRADE WORKMANSHIP.

THE HOOK WALL PUMPING PACKER is used in new wells where the gas pressure is not sufficient to flow same without agitation. This type of packer is recommended for use in a flowing well to conserve the gas. A working barrel can be attached to the lower end of the tubing and when the well ceases to flow, the valves and rods can be run in without removing the tubing or packer.

•

LARKIN SAND PUMPS
with detachable bottom

Original and only successful sand pump made with a detachable bottom. Made of cold drawn seamless tubing, suction plunger accurately fitted. Top and bottom bushings drilled or tapped to gauge so that, if necessary, they can be replaced right in the field without shop work being done on them. Furnished with either regular or bit bottoms.

OPERATES SUCCESSFULLY AT ALL DEPTHS, UNDER ALL CONDITIONS. It has more suction and will bring out more sand and lift more steel from the bottom of the well than any pump made.

FOR TOUGH JOBS WHERE THE CAVINGS HAVE PACKED HARD, there is a **BIT BOTTOM** which is used for drilling and breaking the sand loose. **ITS CHISEL SHAPED DESIGN** prevents sticking and allows successful operation in tightly packed sands. It will break up the hard formations so efficiently, and pass the material through the pump so quickly that the pump may be operated at full capacity without being delayed to any extent—even by the worst conditions encountered.

In the Larkin Regular Bottom, the legs are short, allowing the pump to rest as near the bottom of the hole as possible and still obtain the necessary suction to remove the greatest amount of sand and sediment quickly.

THE LARKIN IMPROVED SAND PUMP will clean out a well quickly, thoroughly and will last through years of hard service. It is widely considered to be the most efficient sand pump on the market.

BE SAFE . . . BE SURE . . . ALWAYS SPECIFY LARKIN

•

LARKIN
PACKER COMPANY

ST. LOUIS, MISSOURI

Warehouse stock at Houston, Texas, Oklahoma City, Oklahoma, and East Texas

AT ALL SUPPLY STORES

lower valve open just enough to flow the oil that enters the well bore. Therefore, only a small amount of expansion actually takes place in the sand. When once in operation the casing above the oil level is filled with gas under pressure. This casing pressure being such that the oil is allowed to flow into the well bore at a normal rate without producing a steep pressure gradient in the sand and, therefore, a more efficient as well as a more complete recovery of oil is obtained. The flowing device can be used in a number of different ways:

1. On wells producing oil that have enough gas pressure to flow them through the device when they will not flow through the casing.

2. On wells producing oil where the air or gas from other wells are used to flow them.

3. On gas wells making water to flow the water and save the gas.

4. On prorated wells to make them flow a certain amount of oil per day without shutting them in.

When used on oil wells around 2400 feet deep it was found that these wells flowed with only enough gas pressure to cause 150 pounds reading at the casing head.

When used in wells not having enough gas pressure additional gas can be supplied through the casing head.

The flowing device has not been tried out on gas wells making water but it is expected that it will be in the near future.

On Prorated Wells

Prorated wells can use the device closing such valve opening that the gas pressure will be built up to a point allowing only the desired amount of oil to be flowed. This is done by means of a gas regulator connected to the casing head. The regulator being so adjusted that the amount of gas is flowed from the casing head as corresponds to the desired amount of oil. The gas dissolved in the oil are in certain ratios varying in different sands and if a certain amount of oil is withdrawn the corresponding amount of gas flows into the well bore. The flowing device acts also as a gas separator when used in this manner. The gas-oil ratio is fixed by nature and can not be changed but if the gas pressure is released as the oil and gas flows into the well bore most of the gas pressure is wasted without lifting the oil. On the other hand suppose the bottom hole pressure is 1000 pounds per square inch and the pressure in the well bore is maintained at say 800 pounds per square inch or just enough below the sand pressure to cause the oil to flow into the well bore in an orderly manner. Then the energy of the expanded gas is not wasted as it passes through the voids of the sand but is used in moving a maximum amount of oil. Approximately the same condition exists in the sand adjacent to the well bore as would obtain when the core of an oil sand is drawn out of the well into atmospheric pressure, that is, the oil has nearly all left the sand due to the gradual decline in pressure as the core is gradually brought to the surface.

On the other hand if the gas is dissipated, which is the case where steep pressure gradients are allowed to take place in the sand, or where no back pressure is maintained in the sand, there exists the equivalent of a bleeding core which will produce very little if any oil. It becomes important, therefore, if efficient recovery is desired, to allow only such gas to expand and flow into the well bore as is necessary to flow the oil and this ratio is fixed, but that part of the gas pressure that is not needed at the time to move the oil into the wall bore should be kept under as nearly normal pressure

Long, Trouble-Free SERVICE

Simplicity of construction, fewness of parts, and a pumping principle which minimizes friction between moving parts, are the characteristics which have made the Fluid Packed Pump the long-lived, trouble-free pump that it is. Staying on the job day in and day out, with a minimum of down time, the Fluid Packed Pump has a record of steady consistent performance. In conditions of excessive volume, pumps of larger diametrical displacement for the same nominal size, may out-produce it on a day-to-day basis, but when the average is taken, it is usually found that steady, uninterrupted performance has more than offset the smaller diametrical displacement. And there are the added advantages of lower pump cost and reduced labor expense, due to longer life and reduced down time.

FLUID PACKED PUMP
PATENTED
1545474 DATED JULY 14 1925
1545475 DATED JULY 14 1925
1549175 DATED AUG. 11 1925
1621046 DATED MAR. 15, 1927
Other Patents Pending

FLUID PACKED PUMP COMPANY
Box 64 Los Nietos, California

Mid-Continent and Texas Distribution:
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MID-CONTINENT
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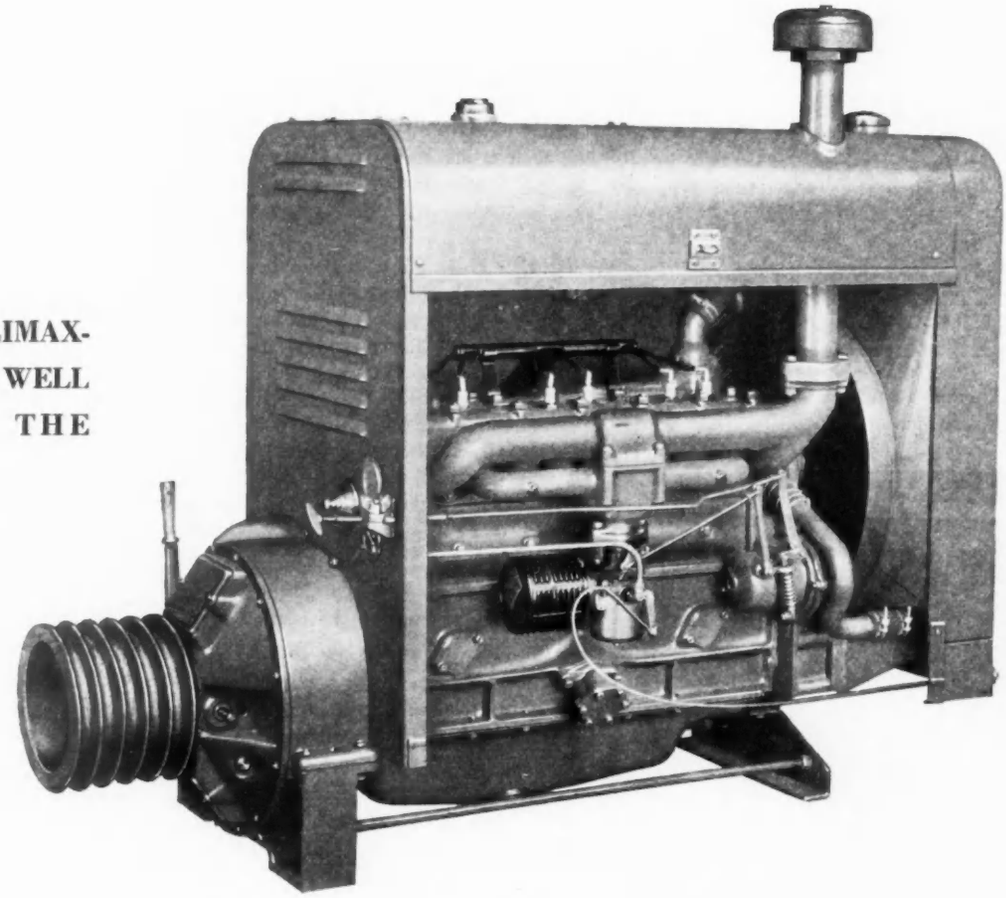
"THE MODERN PUMP FOR MODERN CONDITIONS"

CHECK THESE CLIMAX-CHRYSLER SINGLE WELL UNITS AGAINST THE FIELD!



KEEP the PROFIT in the BARREL!

Reading time 4½ minutes; may mean heavy savings to you.

Don't buy your pumping engine in a hurry to-day and pay high pumping prices ever after. Make comparisons — *point by point*, compare these Climax-Chrysler Units against any other! See why others can't touch them for low first cost, satisfactory daily operation, low maintenance cost. Read the highlights given here. Then let your supply house go into the details!

(1) There are sizes for every pumping job—gear, rig-front, band-wheel or single well.

(2) Ample reserve power at low speed is available. This means low maintenance and long life.

(3) The power is a steady, rapid flow of light impulses; resulting in least embrittling of rods.

(4) Every operation is snappy and effective. Quick acceleration and high speed are available for rod pull.

(5) There are no starved or over-charged intakes — just smooth, even operation.

(6) The power units are light, easy to install and move. No costly foundation or housing is required.

(7) Anyone who understands an automobile can service these units.

(8) Engineered specifically for this country and this service.

SPECIAL FEATURES—Look them over—each a value worth having . . . Pressure lubrication, operates at low speed . . . Tungsten steel inserted exhaust valve seats; minimum valve grinding . . . High compression heads for efficient use of natural gas fuel . . . Water circulating pump . . . Mechanical governor, quickly adjusted . . . Heavy duty oil bath type air cleaner . . . Combination carburetor and gas mixer . . . Battery or magneto ignition . . . Electric starting . . . Instrument panel with switches, ammeter, oil gauge . . . Fuel pump, or fuel tank with filter . . . Radiator, and fan with V-belt drive . . . Complete, weather-tight sheet metal house . . . Twin disc clutch and power take-off . . . Sold for oil field service by:

CLIMAX ENGINEERING COMPANY, Clinton, Iowa

A-7962

as possible in the sand to keep it in a liquid state in solution.

In the ordinary pumping wells where the fluid level is kept low by pumping it is believed that a greater amount of gas than the gas-oil ratio leaves the sand, due to the sharp pressure gradient; and consequently a greater amount of oil is never recovered than if such a back pressure was maintained as would just allow the well to produce its oil and no more.

Hughes Plunger Lift

Hughes Tool Company, Houston, has made an important contribution to oil-lifting science in developing the Hughes plunger lift, a field-proven apparatus adapted to producing oil from deep wells by using only the energy of the gas associated with oil or by supplying additional gas where required.

The installation is placed directly over the well head and thus requires no foundations, and operates without high pressures, or close fits which can be damaged by wear, and without sucker rods, standing valve, or cups, thus eliminating wear on the casing. There is no "live load" on the tubing, no trouble with crooked holes, and no interruption of operation due to paraffin. The apparatus consequently achieves the primary purpose for which it was designed, the elimination of high maintenance costs.

The Hughes plunger lift consists of a string of special smooth bore tubing in which an all-metal plunger travels the entire distance from top to bottom of the tubing and back to the top in making each stroke.

That special tubing is supported at the surface from a flow head which receives the slug of oil lifted on each stroke by the plunger, meanwhile directing the oil to the flow lines. The tubing is fitted at the lower end with a foot-piece to stop the plunger and close the plunger valve at the end of the down stroke.

Fitting loosely in the tubing, the plunger is free to fall by gravity alone and it is raised by gas pressure without the use of sucker rods or cable.

Merely hanging under its own dead weight, the tubing does not support the weight of the oil which is lifted. Such support for the oil carried out during each stroke is afforded, instead, by gas pressure. Neither does the plunger lift a column of oil extending the full length of the tubing, the fluid being produced in short heads, usually not over 300 feet at a stroke.

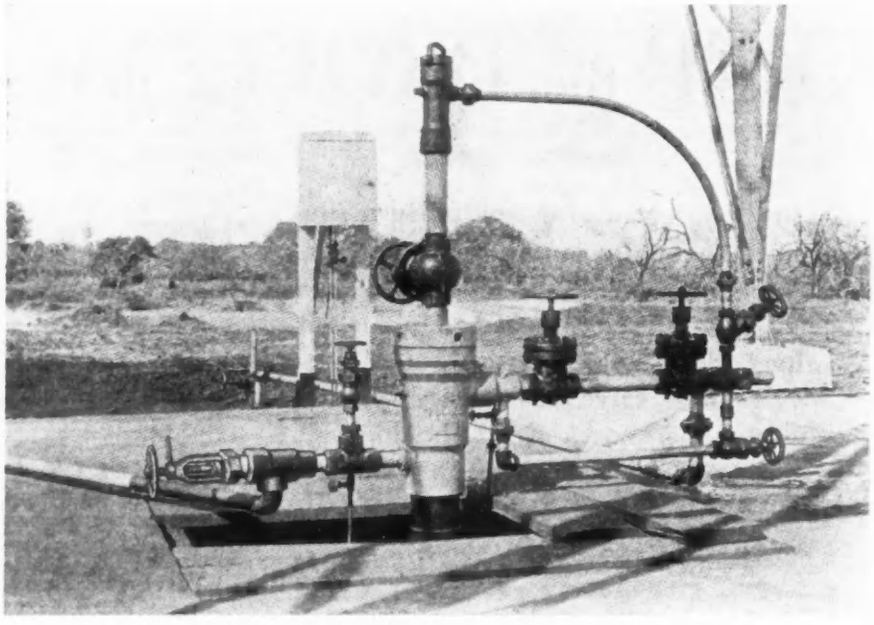
A plunger replacement can be made in less than five minutes. Paraffin can be scraped from the tubing continuously by a special plunger when required, and sand troubles are minimized since complete discharge of the contents of the tubing occurs each stroke.

An advantage is afforded in the fact that the pumping level is definitely known from the depth of the foot-piece, and the volume of fluid discharged each stroke.

On wells which are prorated production can be regulated by regulating the depth of the foot-piece and by choking tubing inlet and discharge. Thus the equipment is particularly desirable for flowing wells that quit when beaned severely.

A well will often operate with the plunger lift on the well gas alone long after natural flow has ceased, according to its manufacturer; and when the well gas falls off, additional gas supplied to the casing will maintain operation without any other changes. It is practicable also to operate a large group of wells from a central compressor station, thus reducing installation and maintenance costs and insuring reliable performance.

In field installations the tubing is run in the well to the proper depth and the flow head and control valves are installed, after which gas pressure is admitted to



Hughes Plunger Lift Installation

IF ABRASION IS YOUR PROBLEM ...find out how I. R. METAL

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This new metal contains no "hardeners" yet can be made to exceed 1400 Brinell. Ideal for metal-to-metal contact due to its extremely low friction qualities. Is unaffected by operating temperatures.

ALFORD I. R. METAL PUMP

has the plunger and liner made of this remarkable new metal, which permits a tolerance of less than .001 inch without seizing. Maximum production is insured, with slippage and emulsification practically eliminated.

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If you can sell a pump which outwears 5 ordinary pumps, you will find our "Protected Territory Proposition" both interesting and profitable. Write today—tell us who you are and where you have contacts.

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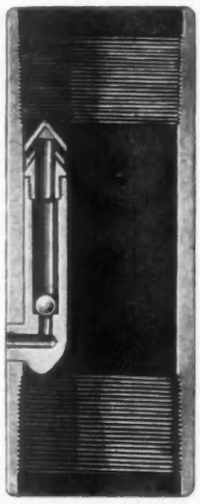
FLOW INSTEAD OF PUMP!

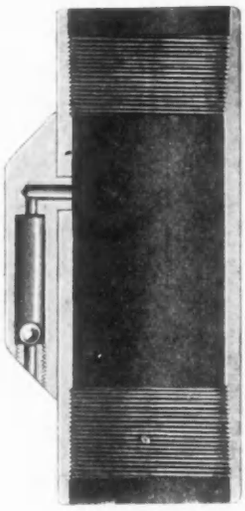
ASSEMBLY

The Greenlee-Taylor Flow Valve is the simplest and most effective gas lift unit manufactured. It is adaptable to use with any style control head. It has been proven in a large number of wells and successfully operated with small top hole chokes — the ideal unit for wells under proration. Either outside or inside type valves (pictured herewith) may be used in a well which has any free gas or when outside gas or compressed air is available.

The outside type is used where no gas or air is available and it is necessary to swab tubing to bring in well.



FLOW VALVE, INSIDE TYPE



FLOW VALVE, OUTSIDE TYPE

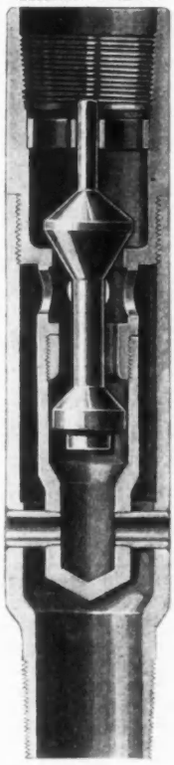
OPERATION

Gas (or air) pressure on the outside of any valve, whenever it exceeds the fluid pressure on the inside, causes gas to pass up around the ball into the fluid in the tubing. This areates the fluid column (oil, mud or water), and causes same to start flowing. This action is continuous unless, and until, the fluid pressure at the level of this valve becomes thirty pounds less than the gas pressure at that level. (Thirty pounds is the usual pressure differential used in our valves for average wells.)

The rush of the gas through the valve under this pressure differential blows the ball against the top seat of the cylinder where, due to fluid tension and pressure, it will remain as long as the outside pressure exceeds that inside.

The next valve below then starts automatically to operate. The operation continues until a point is reached where the well fluid will rise rapidly enough in the tubing to balance (within the limit of the pressure differential) gas pressure at the level of the operating valve, or until all the valves are closed. Well may be choked at bottom, or top, or both, if desired.

CHECK VALVE



Important Points About the Greenlee-Taylor Flow Valve

- Installation cost — less than one-fourth cost of Standard pumping unit.
- Maintenance cost almost nothing.
- Handles larger volume of fluid than can be pumped.
- May be used in choking, intermittent or continuous flow.
- No tubing pulling. No wear. Will handle large amounts of sand.
- Adds safety in completion of high pressure wells.
- An economical method of lifting water from gas wells.

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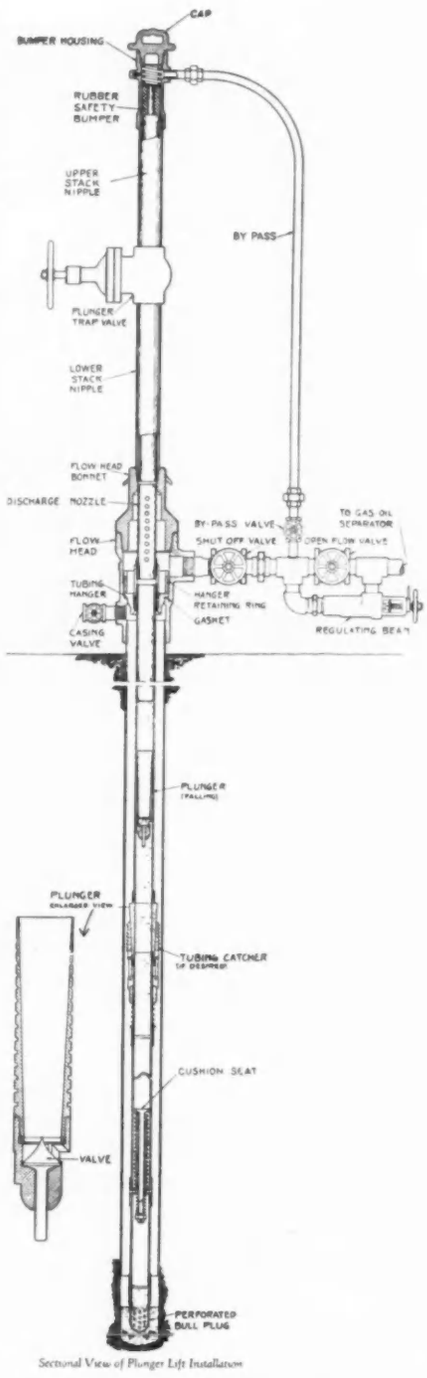
the casing to kick off the head of oil standing in the well. The plunger is then placed in the upper stack nipple with the plunger trap valve closed and the cap screwed into place. The plunger trap valve is then slowly opened, first allowing the plunger valve to drop open as the gate is withdrawn, and then releasing the whole plunger which falls to bottom. When the plunger reaches bottom the plunger valve closes, preventing gas from by-passing through the oil, and the gas pressure builds up below the plunger, raising it with its load of oil to the surface.

On reaching the nozzle openings the oil spills off into the flowhead, reducing the weight supported by the plunger and causing the plunger to rise faster. Oil also rises in the stack nipples above the nozzle openings as the entrapped gas is compressed, and when the plunger finally passes the nozzle openings at relatively high velocity it meets this stationary slug of oil which brings the plunger to rest, opens its valve, and allows it to drop back. When the plunger passes the nozzle openings the gas exhausts from below it, clearing the tubing for the next stroke.

As an alternative to kicking off the initial head of oil with gas pressure, as described above, the upper stack nipple may be removed and a lubricator set up in its place; and through the lubricator a wire line swab may be run to lower the liquid level in the well before dropping the plunger.

If occasion arises for catching and examining the plunger while the apparatus is in operation the shut off valve at the flowhead outlet may be closed and the by-pass valve opened. On the following stroke the oil discharges through the by-pass line and the plunger follows the oil slowly to the top of the upper stack



Sectional View of Plunger Lift Installation

Hughes Plunger Lift

PETOL TOOLS

PETOL Tubing Tong
"The Roustabout's Buddy"

PETOL Rod Wrench
"Roustabout's Right Hand"

The PETOL Twins
for pumping wells

Operators preparing to begin pumping should get acquainted with this two-tool team for rod and tubing jobs. I-Beam design and highest quality chrome-nickel steel provide maximum strength with minimum weight. Both are guaranteed against breakage.

PETOL Tubing Tong: Jaws always ready and automatically grip when stabbed on pipe. Nothing to latch or unlatch. Removes easily, yet will not fall off. Cam lever lock provides utmost safety and permits turning pipe in either direction without reversing tong. Furnished with three high speed steel bits. Made in eight sizes to take care of any size tubing.

PETOL Rod Wrench: To our knowledge this is the only rod wrench that ratchets freely, yet has the desired "hammer-action" for setting up and breaking tough joints. Goes on and comes off the rod square easily, but will not fall off. It is fast, safe, exceptionally strong. Available in all sizes, with handles varying in length from 12" to 36".

Sold by all Leading Supply Stores

GEARENCH MFG. COMPANY

313-323 HUGHES STREET

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"Most Complete Line of Tongs in the World"

MADE ENTIRELY OF STEEL

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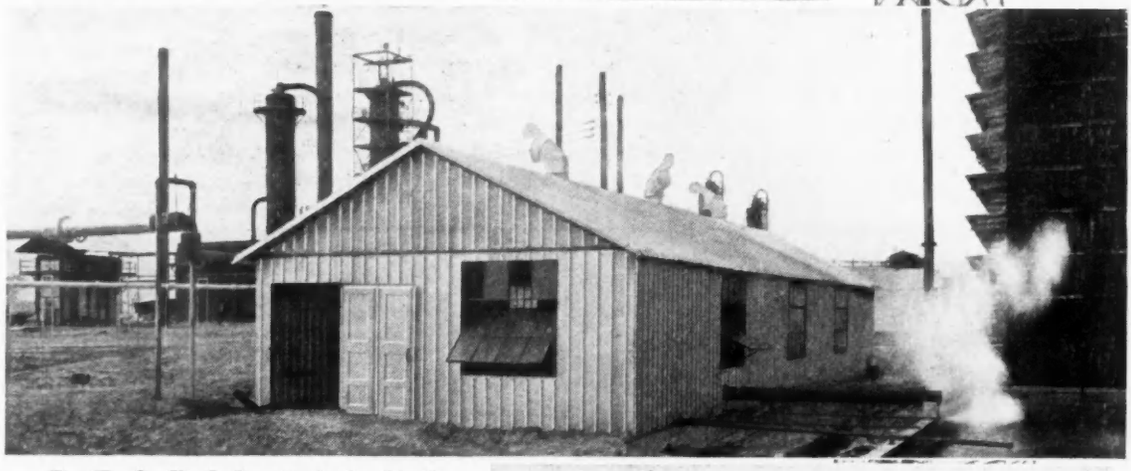

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STEEL
BUILDINGS
Shelter Every
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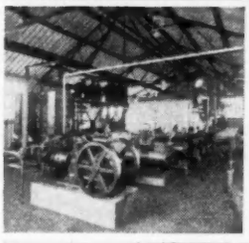

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QUICK SHIPMENT—QUICK ERECTION

Pumping equipment lasts longer and works better when sheltered in fire-safe, weather-tight structures.

Always the most economical fire-safe structures, Butler Ready-made Steel Buildings, at the rock bottom prices which are still in effect can be installed with little if any more investment than frame structures sheathed in corrugated iron.

Considering their full salvage value they cost less. Butler Ready-made Steel Buildings are easily and quickly taken down and re-erected. Their standardized unit construction makes possible quick shipment and quick erection of any size and type of pump building required.

Telephone, wire or write for Ready-made Building catalog and proposal on the size and type building in mind. Or, see a Butler bolted tank and steel building field distributor.

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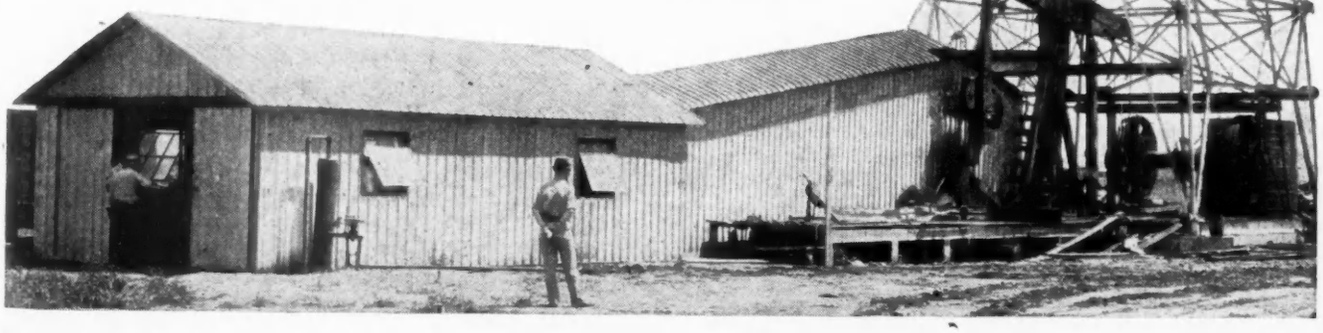


nipple, where it stops against a rubber bumper which seals off the escape of gas, which in turn gives notice that the plunger has reached the bumper. The plunger trap valve is then closed, trapping the plunger in the upper stack nipple from which it can readily be removed for examination or replacement. The rubber bumper is made of a synthetic rubber which is not affected by oil.

For any given size of tubing used in this method of producing a well the operating casing pressure which is required depends primarily upon the depth and rate of production of the well, but is comparatively low. In a well 3000 feet deep pumping off bottom and producing 100 barrels of oil per day, for instance, the necessary pressure is about 63 pounds per square inch when 2½-inch tubing is used.

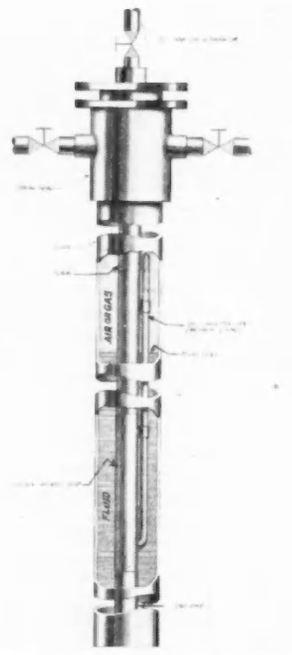
The plunger lift will operate very satisfactorily, according to the manufacturer, whenever the gas coming through the tubing is about 500 cubic feet per barrel of oil per 1000-foot lift. The well may make all of the necessary gas itself and so be self maintaining, it is found in actual practice; and if the well does not yield sufficient gas for operation of the plunger lift additional gas may be introduced into the casing to bring the total output gas to the proper volume for operation.

Cost of compression is relatively low since the required lifting pressures are low and since the gas requirement is small.

Production can be regulated, within reasonable limits, by means of the adjustable flow bean in the discharge manifold, an increase of back pressure reducing the production rate. If a particularly high back pressure is needed in limiting production it is preferable to choke the inlet to the tubing at its lower end to such extent that only a moderate beaning is required at the flow head, since such practice achieves the production restriction without increasing the gas-oil ratio as in beaning at the flow head.

Mission-Haywood Syphon Lift

Mission Manufacturing Company, 2416 Railroad Street, Houston, has successfully attacked the problem of lifting oil economically from both deep and shallow wells through the use of the principles of the syphon and the Venturi throat in its device, the Mission-Haywood syphon lift.



Mission-Haywood Syphon Lift

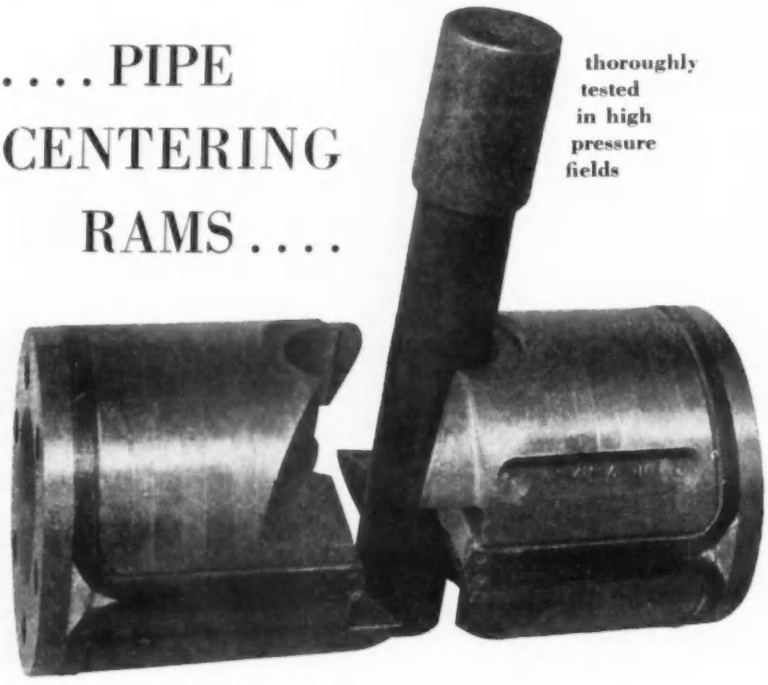
The device has been thoroughly and successfully tested, more than 200 installations having been made in water and oil wells of varying depths, under a broad range of conditions.

Operation of the device involves the use of a jet to suck the fluid from the bottom of the well and forcing of the fluid through a series of Venturi throats, which convert the static energy in compressed air or gas into the

Another Cameron Improvement

.... PIPE CENTERING RAMS ....

thoroughly tested in high pressure fields



Wing Guides, built as integral part of Preventer Rams, remove the one imperfection from pressure operated preventers. They guide pipe to center of hole instantly on application of pressure, regardless of its position in preventer opening. Pipe absolutely cannot fail to be centered when rams close.

ANOTHER IMPORTANT ADVANTAGE: Damage to packing from pipe contact is eliminated, since corner of wings extends above packing, protecting it at point of contact where previously first packing trouble developed.

All New Cameron Preventers are equipped with these Pipe-Centering Rams, and old Cameron Preventers can get the improved feature simply by interchange of rams.

Ask for a demonstration of this newest feature in Blowout Prevention . . . Now.

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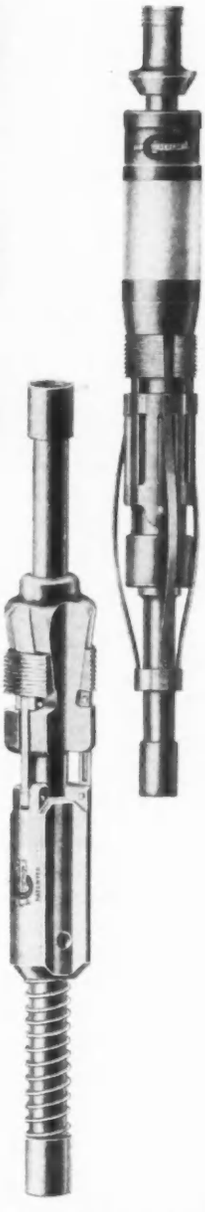

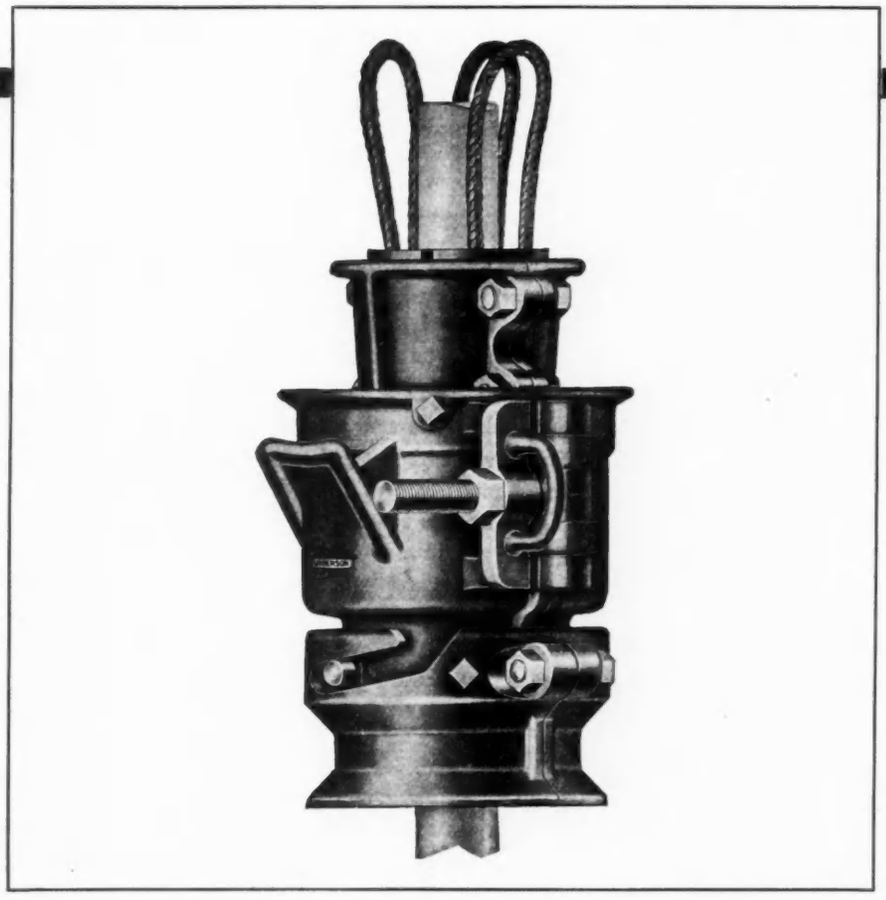

FOR EAST TEXAS!

when wells are put "on the pump"

To prevent gas and oil from leaking by, when tubing is being run or pulled—and for real *speed* of action—the automatic GUIBERSON Tubing Stripper has no competition. It forms an absolute seal between tubing and casing. Pulling crews want it, for it keeps poison gas, oil and slush off of the men. Made in two halves permanently hinged at back and with strong screw latch at front.

The GUIBERSON Packer is unequalled for forming a tight, dependable pack, at any depth, between tubing and casing, and confining the flow to the tubing. The GUIBERSON Tubing Catcher, inserted as a short section of tubing near bottom of string, automatically stops the tubing from falling and causing a tedious fishing job or even abandonment of the well. The GUIBERSON Swab is superior to all other swabs for any swabbing job.

All GUIBERSON specialties are patented. Phone our Dallas office and we will have one of our field men call on you promptly.

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GUIBERSON

BETTER BE SAFE THAN SORRY — GUIBERSON

kinetic energy of a high velocity column of gas and fluid, which in turn raises the fluid to the surface. The overall efficiency of this system has proved itself to be around 60 per cent, according to the manufacturer of this device, such percentage being pointed to as exceptionally high.

Described in more detail, the Mission-Haywood syphon lift consists of a section of tubing about two feet long, into which an air or gas line is led from the outside, this line ending in a nozzle turned upward in the tubing. Above the nozzle is a series of Venturi throats placed in line with the nozzle. The device described is placed in the tubing string at the desired depth with tubing running from the lower end of the tool to the bottom of the well to act as a suction pipe. The air line from this tool does not go to the top of the well, but runs upward along the side of the tubing, to which it is strapped, to a height above the fluid level, and ends there in a perforated nipple.

Pressure in the annular space of the well, either built up by the well itself or by outside means, is exerted downward on the fluid in the casing, thus creating an artificial submergence for the tool, while at the same time gas is passing through the air line to the tool and raising the fluid to the surface. Thus all energy created by the well itself is used to help flow the well, and only such energy need be added as is lacking in the well.

There is no pounding action on the producing sand since the syphon lift is a constant flow tool, bringing the fluid to the surface in a steady stream of gas and fluid, thus eliminating the heads usually encountered with air or gas lifts. On the contrary, due to the steady suction developed in the device, the flow through the sand is always in one direction and has a tendency to keep the formation clean and loose.

This type of lift has proved exceptionally satisfactory for use in salt water wells, according to the manufacturer, both because of the large volume of fluid that can be handled and because the pressure held constantly on the fluid has a tendency to hold back the water. In some cases it has been found that by periodically flowing wells containing large percentages of salt water the percentage of oil has been greatly increased, and in one case pure pipe line oil was produced. It is concluded, in such cases, that the water has a tendency to settle out of the oil during shut-in periods, thus allowing the oil to be produced nearly free of water during the flowing period. By producing salt water wells under this system a considerable proportion of the problem of handling the water may be eliminated, it is stated.

By the Mission-Haywood method the necessary amount of gas for lifting oil is exceptionally low, according to the manufacturer. In substantiation it is pointed out that in four wells in the Oklahoma City field which were previously produced by blowing through the

We Married the Gulf Coast

. . . more than twenty years ago for better or worse until death do us part, and we don't want a divorce, thank you. We know chaps who used to fight this supply business who now keep books or dig ditches or manage banks. Not us! We know the Gulf Coast well digger and he knows us. We're settled for life at a game we like, and we'll play the cards as they fall. Our metaphors may be mixed but our intentions are good, and any old timer will tell you that PELCO on any oil field product makes the cheese more binding.

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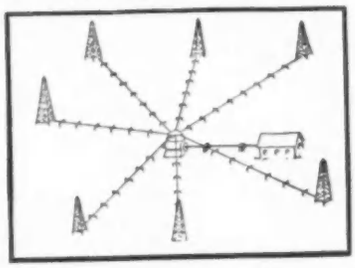

Every well in a group pumped from a central power can and should be properly balanced

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Martin-Decker Corporation

P. O. Box 249

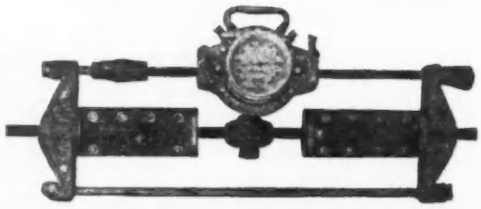
LONG BEACH, CALIF.

that you are spending a lot of money equipping your wells for pumping, your next consideration should be the most efficient operation of the pumping equipment.

Lowest operating costs are realized when your wells are pumping at the proper speed, length of stroke and with the correct amount of counterbalance.

It is possible to obtain these conditions only by periodically weighing your wells with a Martin-Decker Pull Rod Dynamometer.

The M-D Pull Rod Dynamometer for weighing wells pumped from central powers.



IT'S THAT *EXTRA PAIR-*

ANY MERCHANT will tell you that his profit comes from that *extra* sale at the end of the day. That the bulk of his sales go for rent, light and other overhead—but that last, that *extra* sale is profit.

Your problem is not unlike that of the merchant.

Your profit, too, is contingent upon that *extra*, that additional service you get from that Rotary Hose, the *extra* hours you get from that Pumping Belt, those stuffing box rings, and that packing.

You read many advertisements extolling the virtues of various makes of rubber goods. You listen to the arguments of many salesmen.

Some of the claims made are prodigal — many of them are fair and reasonable.

Obviously you want the greatest value for your money but this array of claims and counter-claims tends to confuse you.

Most of the mechanical rubber goods offered you are honest products, backed by dependable service. You won't go far wrong in selecting any one of the leading makes.

The United States Rubber Company makes no extravagant claims for its line of belting, hose, packing, etc. It prefers to invite your attention to *that extra service* for which all "U. S." products are famous and which has made "U. S." the world's largest producer of rubber.

United States Rubber Company

1790 Broadway • New York City

"U. S." Rubber Products give that EXTRA service.

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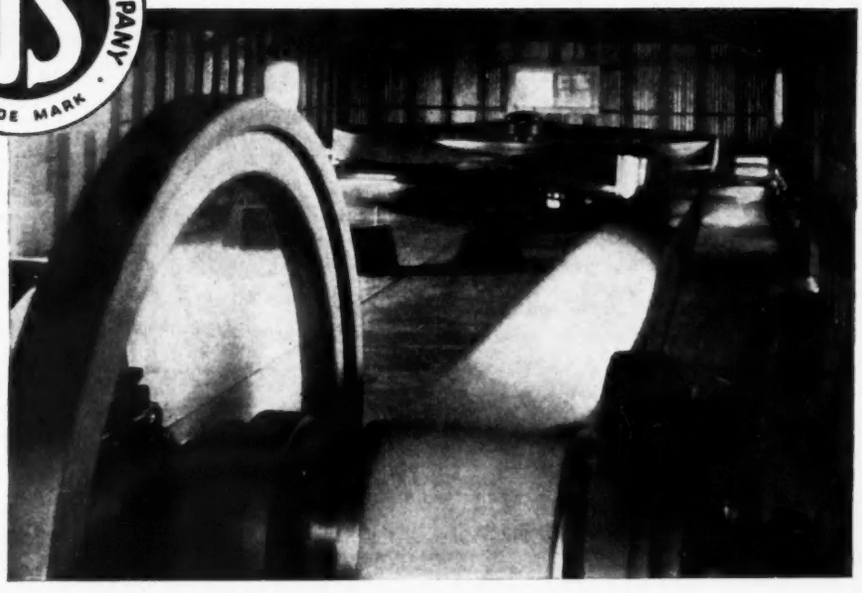


Comparative service records on several makes of belts invariably demonstrate "U. S." superiority.

"Never saw a belt equal this performance under these conditions"—"Has given better service than any Belting we have ever used"—are comments frequently made by "U. S." Belt users.

The United States Rubber Company invites your inquiries on "U. S." Royal Pumping and Drilling Belts; "U. S." Matchless and Peerless Rotary Hose, Stuffing Box Rings; in fact, any piece of rubber equipment used by the Oil Industry.

Branches in all principal cities.

tubing and flowing through the casing the gas-oil ratio was reduced from approximately 4000 feet per barrel to approximately 500 feet per barrel upon installing the syphon lift. In other fields the oil has been lifted with as little as 175 feet per barrel and in no case reported has the gas exceeded 1000 feet per barrel of oil produced, it is asserted.

The efficiency of this tool depends, it is stated, on having approximately the correct size of tubing for the volume of oil produced. Extremely low capacity wells should have tubing as small as 1¼ inches, while the average wells may use two-inch or 2½-inch tubing successfully.

Averaging from 150 to 300 pounds, the flowing pressures of wells equipped with this lift are considered comparatively low. They depend more on the amount of fluid produced than upon the depth of submergence, although the fluid handled will as a rule increase in proportion to the submergence. The flowing pressures in the 6000-foot Oklahoma City wells ranged around 250 pounds, producing from 400 to 600 barrels of oil. The fact that the gas pressure in the tool does not depend so much on the submergence as on the volume of fluid handled, and that it is exerted only on the inside of the lift, makes it possible to lower the back pressure on the sand materially.

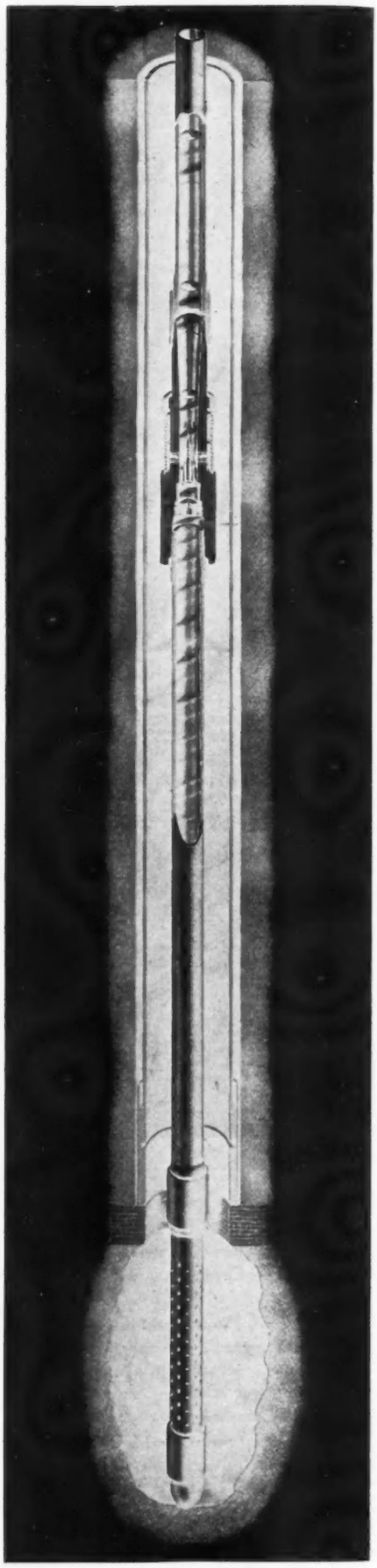
Williams Oil Well Flow-Meter

Oil Well Flow-Meter Corporation, Philcade Building, Tulsa, is marketing the Williams oil well flow meter, which is described as "a bottom hole choke combined with a gas meter, installed in the tubing string operating at the working fluid level of the oil in the well."

The device has been developed through long experimentation and research and five years of actual operation in oil wells. It is likened by its makers to an automobile carburetor in that it produces an efficient mixture, creating a different character of flow from that usually obtained, namely a piston type flow.

It permits production of only that amount of gas necessary to lift a barrel of oil from the depth of the working fluid level to the surface, such amount being metered into the tubing through eight orifices made of jewels of hardness sufficient to resist cutting from sand and to eliminate corrosion. Gas which remains in excess of that proper gas-oil ratio is retained in the sand, consequently, for future flowing of the well, thus providing relatively long flowing life of the well by keeping the sand near the bottom of the well highly charged with light hydrocarbons.

The device will harness or hold constant the bottom hole pressure as well as the casing-head pressure, according to its makers, and therefore water en-



Williams Oil Well Flow Meter

The Martin-Decker Pump Dynamometer for Weighing Wells Pumped With the Walking Beam

Now

that you are spending a lot of money equipping your wells for pumping, your next consideration should be the most efficient operation of the pumping equipment.

Lowest operating costs are realized when your wells are pumping at the proper speed, length of stroke and with the correct amount of counter-balance.

It is possible to obtain these conditions only by periodically weighing your wells with a Martin-Decker Pump Dynamometer.

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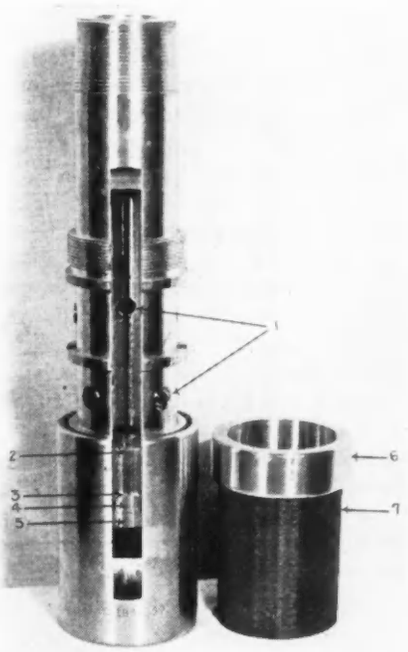


Williams Oil Well Flow Meter

This illustration shows important parts of the Williams oil well flow meter, as follows:

(1) Eight jeweled gas orifices arranged symmetrically around body of device above oil choker and mixing cup;
(2) Mixing cup which breaks up single oil choker—stream into eight streams, in order that thorough mixture of oil and gas can take place;
(3) Gasket;
(4) Oil Choker;
(5) Oil Choker lock nut;
(6) Screw retaining ring for screen cover;
(7) Screen cover for gas orifices. The meter is threaded at both ends for standard A.P.I. tubing. The flow meter is made of high chromium stainless steel. Screen and orifice bodies are made of monel metal.

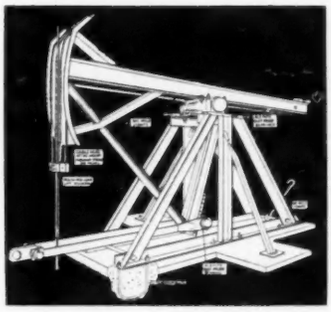
croachment is withheld from the well by maintenance of a critical differential from the sand to the bottom of the hole. Thus there is provided back pressure to shut off water without loss of normal daily production.

An important feature of the Williams device is the provision which it makes for control of gas or gas pressure. Application of back pressure at the sand face in an oil well sets up two basic reactions, it is pointed out in explanation of the theory of the Williams equipment. In the first place the differential flowing pressure from the undisturbed areas back in the oil reservoir to the bottom of the well is reduced, and in the second place the static pressure in the sand area immediately surrounding the well is raised.

The immediate effect of the first reaction on the water flow and gas flow toward the well is a sharp reduction in the velocity of flow, and a temporary reduction of the velocity flow of the oil. The effect of the second reaction on the oil and gas is manifested by an absorption of a portion of the gas and light volatile constituents back into the oil. The absorption of the gas into the oil increases its fluidity so that the velocity flow of the oil toward the well is maintained at the same rate or slightly higher than when no back pressure is applied. This maintenance of the velocity of the oil flow toward the well, due to increasing its fluidity, can be carried up to a certain percentage of the reservoir pressure applied as back pressure. Beyond this point the velocity flow of the oil decreases, because the differential flowing pressure, which is the force moving the oil toward the well, has been reduced to that minimum that will no longer maintain the velocity flow even of the highly fluid oil. This is the critical percentage of back pressure. The differential flowing pressure when the critical percentage of back pressure is applied is the critical differential from the sand reservoir to the bottom of the well.

Long before the critical amount of back pressure has been reached, the discussion continued, the flow of water

66 INCH STROKE



NEW EXTRA HEAVY UNDER PULL JACK FOR DEEP WELLS

This extra heavy cable Pumping Jack is a part of the newly designed line of deep well pumping equipment that we are now manufacturing. This Jack has a maximum stroke of 66 inches and a polish rod load lift of 20,000 pounds. All the rigid framework is arc-welded and the bearings are dust proof with Alemite fittings. The other members of this new line of extra heavy equipment are designed in the same practical way and are constructed to meet the requirements of the field and "to take it." For additional information ask for the new catalog.

TEXAS STEEL COMPANY
FORT WORTH, TEXAS

through the sand toward the well has been stopped, because water does not absorb natural gas except to a limited extent; its fluidity therefore is unchanged. The lowered differential flowing pressure is not sufficient to force the water through sand.

The makers of the Williams device carried out extensive experimentation under actual producing conditions involving a wide variety of producing sands and wells in determining the critical percentage of back pressure or the critical differential, and have incorporated knowledge so gained into the design, regulation, and adjustments of their apparatus.

During their heading stage, it is pointed out, wells flow very irregularly because the mixture of the oil and natural gas is inefficient; and consequently many wells are put on the pump when they still have sufficient gas and gas pressure to be made to flow for long periods under conditions of efficient mixture. Wells of this classification can be rejuvenated and brought back to steady flowing conditions with relatively small lifting costs through the continuous mixture of oil and gas afforded by the Williams oil well flow meter, it is asserted by the manufacturer of the device.

PUMPING WELLS need WALKER Sucker Rod GUIDES

Put Walker Guides in your pumpers and learn the difference. No other guides like them on the market.

Walker Guides stop tubing cutting and increase pump life. They stabilize rods and pump and stop practically all buckling and slapping. They have exceptionally long life and will pay for themselves many times over by savings effected.

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Among the special qualifications claimed for the device is its adaptability to fields susceptible to paraffin trouble. In wells that paraffin badly, it is pointed out, the paraffin generally extends from the top down to a point where rapid expansion and consequent refrigeration of the gas begins to take place under uncontrolled pressure methods of producing. The depth to which the paraffin extends varies usually between 800 feet and 1500 feet from the top of the well, but may be considerably lower in very gassy wells which flow with a violent spray flow.

With the Williams device the type of flow is by "pistons" or very short heads of intervals of from three to 10 seconds. These oil pistons, followed by short gas pistons, are delivered unbroken into the separator. There is no rapid expansion of the gas piston, and consequently no refrigeration at any stage of the flow. There is very little change in the temperature of the oil and gas from the working fluid level in the well to the top. In addition there is a scouring action exerted by the piston type of flow all of the way through the tubing from the flow-meter to the separator. Therefore paraffin deposition in the tubing is prevented when the proper design of installation is made.

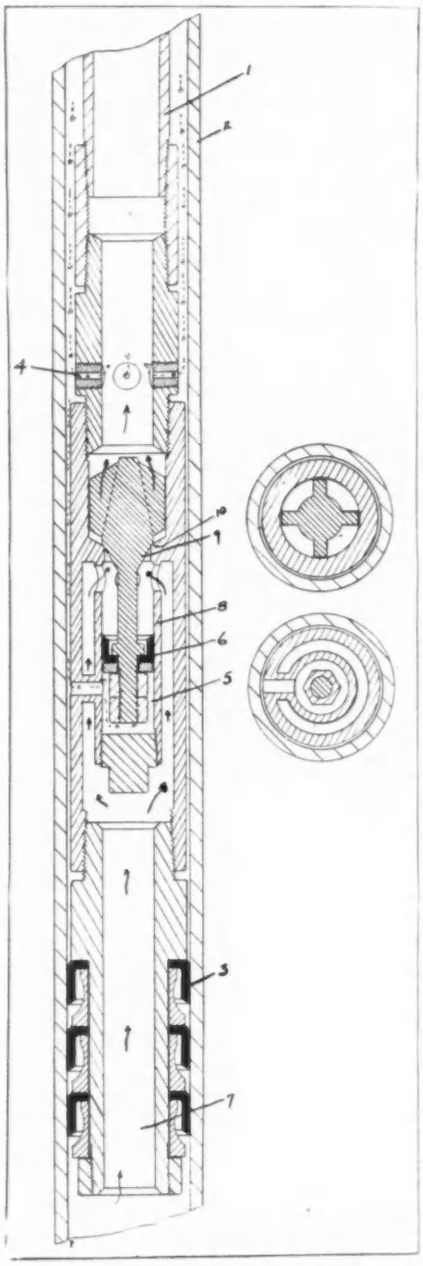
Otis Flow Regulator

H. C. Otis, head of The Southern States Company, Incorporated, 927 Slattery Building, Shreveport, Louisiana, has recently developed a "flow regulator," which promises to find successful application in field work. Operated in laboratory form, the balanced-valve device works smoothly; and at the beginning of July the company was preparing to test it underground.

This device, which is the result of several years' experience with bottom hole chokes on the part of the Southern States Company, is described by Otis as a combination bottom hole valve and bottom hole flow regulator. It consists of a valve balanced with respect to submergence pressure and so constructed that flowing pressure acting from above tends to close it to cut off the further admission of fluid into the tubing while the input air or gas pressure acting from beneath tends to open it to admit fluid into the tubing.

The valve can be open to admit fluid into the tubing only when the input air or gas pressure is a predetermined amount greater than flowing pressure. Input air or gas orifices are provided above the valve, so that during flow the admission of air or gas into the tubing is constant while the admission of oil is intermittent or so regulated by the relation of the input air or gas pressure to the flowing pressure that the latter can never quite equal the former. Consequently the tubing cannot "load up" even at very low rates of flow.

Flow can be stopped either by closing in the tubing surface valve or by closing off the supply of input air or gas at the surface. Since either operation tends towards a higher flowing pressure than air or gas pressure, it follows that the valve will immediately close and will prevent more fluid from entering the tubing until flow is to be resumed. With the bottom hole valve closed, fluid levels within and without



Southern States Bottom Hole Flow Regulator

the tubing cannot equalize, and a low rather than high kick-off pressure is assured.

Operation of the Southern States Company bottom hole flow regulator is described herewith in detail through reference to the accompanying illustration.

In the sketch, (1) represents the flow string within a larger tubing string or casing (2) and packed off from it by either the inverted pump cups (3) or by a packer.

The input air or gas is pumped down between the strings (1) and (2), entering the flow string (1) through the orifices (4). The input air or gas is "dead-ended" in chamber (5) up against the special cup (6).

Fluid, under submergence pressure, enters at (7), flows up around cylinder (8) and tends to raise valve (9) from its seat (10). This fluid, however, also works downwardly against cup (9) tending to close the valve, thus blocking the flow of more fluid.

The area packed off by the pump cup (6) is slightly greater than the effective area of the valve seat (10); consequently the force acting downwards against cup (6) will be slightly greater than the force acting upwards against valve (9), so that if the valve is to be open to admit flow, the input air or gas pressure in chamber (5) acting upwards against cup (6) must be slightly greater than the flowing pressure acting downwards against valve (9).

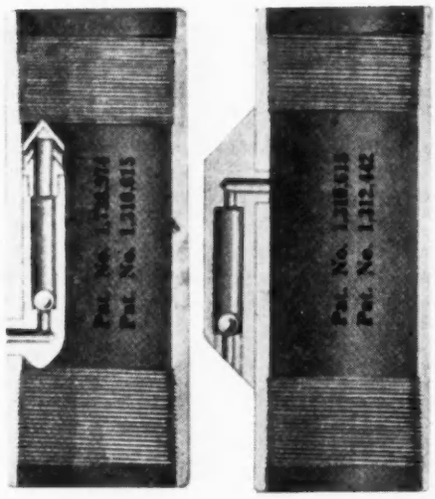
The valve will open and remain open only when the input air or gas pressure acting upwards against cup (6) is a few pounds greater than the flowing pressure acting downwards against the top of valve (9).

Greenlee-Taylor Flow Valves

Western Pneumatic Company, 2121 Alamo National Building, San Antonio, Texas, makes a flow valve which is used for kicking-off wells or continuous flow. The valve is used in bringing in high pressure wells and with it wells can be choked or flowed intermittently. It is made in both inside and outside types, either being applicable in a well which has any free gas or when outside gas or compressed air is available, while the outside type is used in wells where no gas or air is available and it is necessary to swab tubing to bring in the well.

The valves are made of non-corrosive alloy welded into a special seamless tubing collar and fitted with a steel ball.

In the operation of the valve the gas or air pressure on the outside of the valve causes gas to pass up around the ball into the fluid in the tubing, provided such pressure on the outside is greater than the fluid pressure on the inside.



Greenlee-Taylor (Western Pneumatic Company) flow valves. That at the left is the inside type, and that at the right the outside type.

Introduction of the gas aerates the fluid column, consisting of oil, mud, or water, and causes the fluid to start flowing. That action continues until fluid pressure at the level of the valve becomes 30 pounds less than the gas pressure at that level.

Gas rushing through the valve under that pressure differential blows the ball against the top seat of the cylinder, where it will remain, due to fluid tension and pressure, as long as the outside pressure exceeds that inside.

The next valve below then starts operating automatically, continuing until a point is reached where the well fluid will rise rapidly enough in the tubing to balance, within the limit of the pressure differential, the gas pressure at the level of the operating valve, or until all the valves are closed. The well may be choked at bottom or top, or both.

W-K-M Fixed Load Fluid Lift

W-K-M Company, 220 Roberts Street, Houston, has employed a new application of compressed air or gas in development of its W-K-M fixed-load fluid lift.

The basic idea of the system that is used to lift a uniform, limited volume of fluid at each discharge so as to require the lowest possible operating pressure of gas or air as well as the least possible volume.

In order to accomplish this a collecting chamber is suspended on the bottom of the regular well tubing. Chamber may be of any desired capacity—for instance, for one barrel to three barrels, or even more.

The collecting chamber is located at any desired producing level, irrespective of the height of the fluid in the well.

When the collecting chamber is filled with fluid, a float automatically closes the incoming fluid valve, and opens an air valve so that compressed air or gas in the casing is used to eject all of the fluid in the collecting chamber. No plunger of any kind is used, as the compressed air or gas is behind the fluid as it is blown out.

The float drops down when the fluid has been pushed out, and after a definite interval the air valve is closed. The air valve is kept open only long enough to fully blow out all of the fluid from the collecting chamber, and through the well tubing.

Between the discharges there is no fluid in the well tubing, and no pressure in the tubing, so that the hydrostatic pressure on the bottom of the well is reduced to the point at which the collecting chamber is located.

A packer is used on the tubing line above the collecting chamber, but under the fluid level so that no pressure carried in the casing is applied against the bottom of the well itself. The operation of the unit is entirely automatic, and will produce all of the fluid which comes into the bottom of the well, carrying it into the gathering tank at any reasonable distance from the well.

Where a restricted amount of fluid must be taken out of the well to comply with proration, or otherwise, adjustment can be made so that the desired amount of production can be secured.

Unlike many of the other applications of air or gas to wells, the W-K-M fluid lift is designed as a permanent pumping installation to be used until the well is abandoned.

Other New Oil Lifting Equipment

Within the second of the two mentioned groups of newly developed installations for lifting oil are the following.

Reda Duplex Reciprocating Pumping Equipment

Reda Pump Company, Bartlesville, Oklahoma, has developed an assembly known as the Reda duplex reciprocating pumping equipment, which has established its value through field service, including duty in the East Texas field. Designed primarily for handling small volumes of fluid from oil wells of any depths, the equipment furnishes a

small, compact unit for installation at the bottom of the tubing.

For wells with eight-inch or larger casing the equipment is furnished in a 700 series size weighing under 1200 pounds, and for wells with six-inch or larger casing in the 500 series size weighing less than 600 pounds.

Aside from a derrick or other means of handling the tubing, the only surface equipment required for the Reda installation is a steel reel for spooling the electric cable when the unit is withdrawn from the well, an electrical switch and well head connections.

The various parts which make up the assembly include a Reda motor; duplex power head; duplex pump head with liners, plungers, and valves; a three conductor transmission cable and reel; cable clamps and a control switch.

For use with the 700 series installations motors range from five to 30 horse power, and for the 500 series sizes five to 10 horse power. The duplex power head provides two gear reductions: 24 to 1 for 150 strokes per minute, and 18 to 1 for 200 strokes per minute. The 700 series has a four-inch stroke and the other size a three-inch stroke.

For the 700 series size the pump head will accommodate one-inch to 2¾-inch working barrels, and for the 500 series one-inch to 1¾-inch working barrels.

Designed in such way that no sand trap is formed between cages and liner, the liners and plungers are of hardened alloy material, and the small area between suction and discharge valves and resulting high compression ratio eliminate danger of gas locking in handling of gaseous fluids.

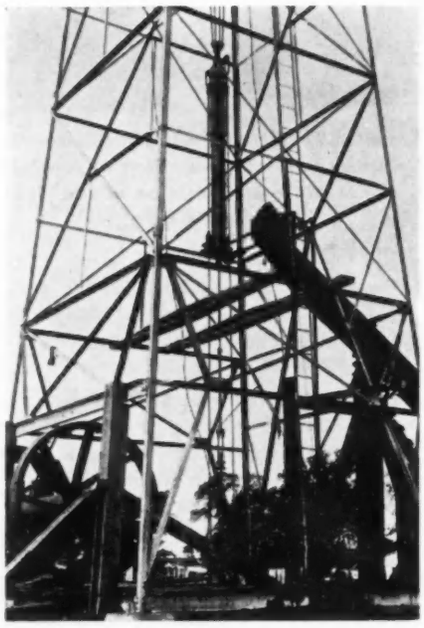
With its different plunger sizes the 700 series unit will handle volumes as follows: at 150 strokes per minute, 218 barrels per day from 7500 feet and up to 1050 barrels per day from 1500 feet; and at 200 strokes per minute 290 barrels per day from 7500 feet and up to 1410 barrels per day from 1500 feet.

Similarly, the 500 series unit has capacities as follows: at 150 strokes per minute, 100 barrels per day from 6500 feet and up to 320 barrels per day from 2500 feet; and at 200 strokes per minute 140 barrels per day from 6000 feet and up to 430 barrels per day from 2000 feet.

For the 700 series units the recommended tubing sizes are 1½ to two inches, and for the 500 series 1¼ to 1½ inches, although larger tubing may be used.

Sullivan Pneumatic Pumping Cylinders

Sullivan Machinery Company, 400 North Michigan Avenue, Chicago, Illinois, has developed an installation for lifting oil which is of interest and importance and which, incidentally, has found practical field application in the East Texas field as well as in other producing areas. It is the Sullivan pneumatic pumping cylinder, a compressed air engine designed for use with the Carr pneumatic pumping system for oil wells.



Sullivan Pneumatic Pumping Cylinder Installed.

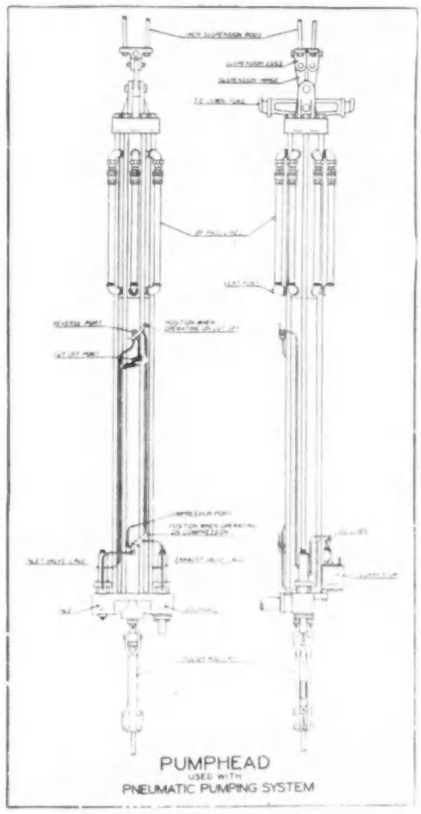
The pumping cylinder is suspended from the top of the derrick, and its piston rod is direct connected with the polish rod of the well, actuating the well pump by direct vertical reciprocating motion. Compressed air or gas is supplied from a central compressor unit which serves a group of wells.

This pumping method is designed to eliminate disadvantages and expenses inherent in customary "beam" pumping, according to its sponsors, who claim that the new method, employed on both light and heavy wells at different depths, affords such advantages as low installation and operating costs, low maximum load, lowered stress in the sucker rods, reduced sucker rod breakage, greater range of speed at which the working barrel can be operated, straight lift with no bending stresses on the polish rod, thus assuring less packing maintenance, closer check on proper adjustment of speed to fluid capacity of the well, elimination of concrete or foundation work around the well, thus making possible 100 per cent salvage of equipment, and elimination of the necessity of any counterbalancing.

In the Sullivan units the cylinder is single acting and is equipped with automatic air-actuated poppet valves. On the up-stroke or pumping-stroke air is admitted to the under side of the piston at sufficient pressure to lift the weight of the sucker rods and operate the pump at the desired speed.

On the downward stroke the piston operates against back pressure high enough to counterbalance the weight of the rods and control their downward motion. That back pressure is exhausted from the pump to the compressor suction, reducing the horsepower requirements. In field installations in 2650-foot wells equipped with 2½-inch tubing the discharge pressure from the compressor was noted as 225 pounds and intake pressure 80 pounds per square inch. The mentioned pressures included losses due to line friction.

The simplicity of the equipment is an important feature, the installation containing only three major moving parts: a main piston, and two small pistons for operating the poppet inlet and discharge valves. The cushioning effect of compressed air is taken advantage of for both up and down strokes and the unit consequently operates smoothly and without shock or jar.



Sullivan Pump Head Detail

700 East Texas Wells Now Using Artificial Means of Recovery

High fluid levels assure ideal pumping conditions . . . pressure continues decline

Summary of Pumping and Dead Wells in East Texas Field

Area—	Pumping	Swabbing Agitating Air-gas lift	Dead Wells	Total
Joiner	255	28	44	327
Kilgore	73	24	43	140
Longview	44	15	14	73
Total	372	67	101	540

TOTAL wells in the East Texas oil field that require artificial means regularly and at intervals in making proration allowables has attained a sizeable figure. Engineers in close touch with the situation estimate that more than 700 wells fall within that classification, with 540 accounted for in a recent survey of the field. Additions to the list each day until the field ceases to afford a natural flow is a normal trend that is inevitable. The reservoir pressure is being dissipated at an average rate of slightly more than one pound daily, while the average pressure throughout the field has dropped below the 1200-pound level. A substantial portion of the field now borders on the pumping stage as borne out by the bottom hole pressure surveys.

An accurate accounting of all wells that require pumping, swabbing and agitation is not possible because of the general run of operators—more than 1100 separate companies, partnerships and individuals are in the field—being reluctant to disclose the physical condition of non-flowing wells when violating proration rules by taking lease allowable from other wells on a given property capable of flowing the quota. Small operating units in poor financial condition are particularly guilty of such practices, and are usually overlooked by enforcement officers unless adjoining property owners protest. The larger companies do not enjoy such leniency as a general rule.

Swab "Marginal" Wells

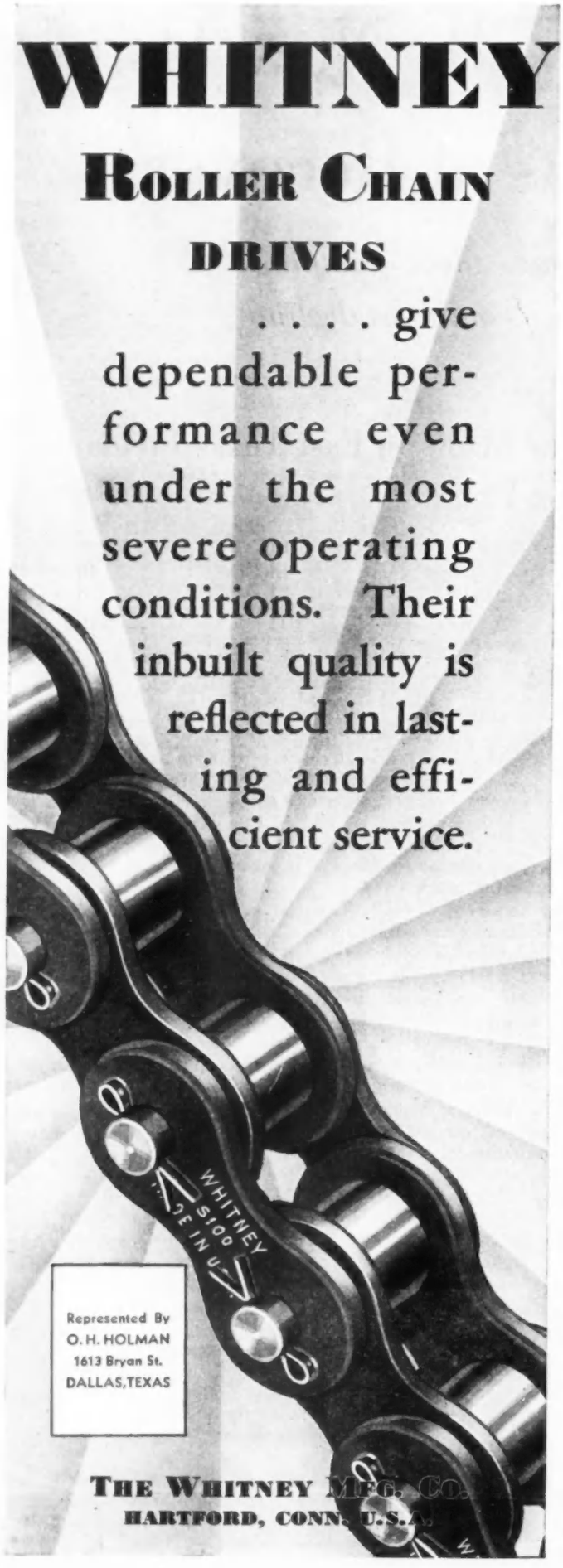
Well swabbing service offered by concerns operating trucks equipped with swab lines and winches is in big demand, as many operators having wells that are restricted to the marginal well quota of 20 barrels daily have found it more economical to produce their oil in this manner than to invest in pumping equipment and lure a pumper. Such wells are usually so poorly equipped with above ground connections that a watchman is not necessary to prevent thefts. This swabbing service is obtainable at prices ranging from $25 to $40 per day, and usually a well's production allowable is pulled within a day or two for an entire month's period.

A survey of wells classified as pumpers, or those that are dead, and swabbing reveals that all sides of the producing structure have contributed. However, the east flank, or that portion of the field furtherest removed from the direct water drive coming from the west naturally has the most pumpers.

Pumping Around Joiner

The pumping section of the field centers on the east portion of the widest section of the Joiner area, where the J. panies ,partnerships and individuals are in the field—being pumpers, or are listed as being dead and swabbing to make proration allowables. This survey is the site of C. M. "Dad" Joiner's Bradford 3, discovery well now on pump with a 20-barrel allowable. It also has the first pumper that was drilled a short distance to the northeast of the discovery well without a natural flow by Stroube & Stroube's W. H. Frederick 1. The latter continues to make its marginal allowance after an elapse of more than 2½ years.

Hunt Production Company, an early entrant, is the largest owner of pumping wells, having 44 on the east side of the Joiner area. This concern introduced the first central power unit in the field. Magnolia Petroleum Company,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owner of the first completed pumper in the Kilgore section of the field, has progressed further on equipping wells to pump than any major owner, having more than 200 wells that could be put to pumping within a few days should the occasion arise. that could be put to pumping within a few days should the occasion arise.

More than 85 pumping wells are making varied quantities of water with their oil production. A number of these are on the east flank of the narrow section of the field near Kilgore, where the appearance of water upset early predictions, but appears to be reaching the Woodbine sand at the contact of the Georgetown lime horizon. Reservoir pressures are rather low on this east flank and permit migration of the water to offset wells that did not drill to the Georgetown.

An ideal pumping condition is assured for the East Texas field, with comparatively high fluid levels after natural flow ceases. Thanks to usual variations in the opinions of engineers as to most economical and efficient methods of lifting oil, nearly every known type of pumping equipment suitable for operation in 3600-foot holes will find a market, while mechanical flowing device manufacturers will likewise come in for a share of the business. By the end of the present year the field will have earned the distinction of creating a greater volume of pumping equipment business than any other major field has offered during its entire history.

Orders Given for East Texas Generating Units

INSTALLATION of electric power generating units to supply motor driven pumping equipment has been authorized by Stanolind Oil & Gas Company and also by the Ed. B. Cox and Jake L. Hamon interests.

Stanolind Oil & Gas Company has awarded contract for erection of five units, and is said to have approved a total of 18 to be used in the field on individual and joint interest properties. The units will consist of 125 K.V.A. generators to be driven by 165 horsepower gas engines. Two units will be installed on the J. C. Persons 15-well lease, W. H. Castleberry survey, Gregg County and one for the C. F. Meadows five-well lease, D. Sanches survey, Gregg County. Simms Oil Company is a part owner in these two properties. Another unit has been assigned the R. G. Mason six-well lease, J. B. Cadena survey, Joiner area. Three units are proposed for the J. Flewellen "A" and "C" leases, M. Mann survey, located on the Gregg-Upshur County line, bearing 11 and 12 wells, respectively. These two tracts adjoin, and are part of a unit operation held jointly with Simms Oil Company and Continental Oil Company.

In connection with these installations Stanolind Oil & Gas Company proposes to have an underground cable system of distribution that will conduct electricity direct from switch boards at the power houses to the motors on the pumping wells without any overhead transmission lines. A special type of insulated cable has been perfected recently to serve this purpose. One of the first underground electricity distribution systems used in the Mid-Continent oil fields was introduced in Kansas some time ago on an installation by Paul E. Workman, Dallas contractor.

Cox & Hamon, owners of three leases with 29 wells in Gregg County, have contracted for erection of two electric generating plants. Gas engines will supply the motive power for the generators.

Pumping and Dead Wells in the East Texas Field—July 1, 1933

JOINER AREA

Owner and Well No.	Survey and County	Date Completed	Status
American Liberty Oil Co.			
J. E. Strickland 1-B	M. V. Pena, Rusk	6- 4-32	Pumping
Geo. S. Anderson & Cox			
W. H. Frederick 1	J. Ximines, Rusk	2-10-31	Pumping
W. H. Frederick 3	J. Ximines, Rusk	4-20-31	Pumping
J. F. Anderson et al			
E. B. Alford 1	I. G. Parker, Rusk	5-31-32	Pumping
E. B. Alford 2	I. G. Parker, Rusk	8-15-32	Pumping
Aston Oil Co. & Ellis (was R. H. Vise)			
Neal Cooper 1	T. J. Moore, Rusk	. . . . .	Pumping
Atkinson-Sandefer Oil Corp.			
Overton School 1	J. Lindley, Rusk	11-25-31	Pumping
Bailey & Trimble			
E. B. Alford 1	I. G. Parker, Rusk	2- 4-32	Pumping
Big Indian Synd.			
A. J. Deason 1	J. Ximines, Rusk	6-16-31	Pumping
A. J. Deason 2	J. Ximines, Rusk	6-22-31	Pumping
Joe H. Burkett et al (was Pat Armstrong)			
E. Cooper 1	I. G. Parker, Rusk	7-25-31	Pumping
Central Oil Co.			
E. B. Alford 1	T. J. Moore, Rusk	3-22-32	Pumping
E. B. Alford 2	T. J. Moore, Rusk	10-19-32	Pumping
E. L. Chapman (Dave Donoghue, Rec.)			
A. P. Finnley 1-A	I. G. Parker, Rusk	5-16-31	Pumping
Como Oil Co. (was Ball-Malone)			
D. Bradford 1	J. Ximines, Rusk	2-16-31	Pumping
Cook Drilling Co.			
E. B. Alford 1	T. J. Moore, Rusk	. . . . .	Pumping
M. A. Corbin & Culp			
E. B. Alford 1	I. G. Parker, Rusk	10-23-32	Pumping
M. A. Corbin & McGaughy			
E. B. Alford 1	T. J. Moore, Rusk	6-14-32	Pumping
C. P. Oil Co.-Pine Prod. Co.			
W. M. Camp-Hammond 1	J. Ximines, Rusk	3-10-31	Pumping
Mayfield-Alford 1	J. Ximines, Rusk	3- 1-31	Pumping
Mayfield-Alford 2	J. Ximines, Rusk	3-15-31	Pumping
Mayfield-Alford 3	J. Ximines, Rusk	6-18-31	Pumping
Mayfield-Alford 4	J. Ximines, Rusk	11- 4-32	Pumping
J. L. Collins-Stroube-Wheelock			
L. J. Pinkston 1	J. B. Cadena, Rusk	9-29-31	Agit'ting
L. J. Pinkston 4	J. B. Cadena, Rusk	7-12-32	Agit'ting
Crabtree-Foster-Jeffries			
Giles 1	M. J. Pru, Rusk	5-15-31	Pumping
Consolidated Oil Co.-Primrose Pet. Co.			
W. M. Camp 1	J. Ximines, Rusk	4- 1-31	Pumping
Deep Rock Oil Co.-Foster et al			
W. W. Holland 1	J. Ximines, Rusk	4-21-31	Pumping
W. W. Holland 2	J. Ximines, Rusk	5-18-31	Pumping
Delano Oil Co.			
Neal Cooper 1	T. J. Moore, Rusk	2- 8-33	Pumping
Droppleman Dev. Co.			
P. C. Warren 1	W. G. Tutt, Rusk	7-22-31	Swab'ing
East Texas Oil Ref. Co.-Foster-Deep Rock			
C. D. Ashby 1	J. Ximines, Rusk	12-13-30	Pumping
C. D. Ashby 2	J. Ximines, Rusk	3-15-31	Pumping
C. D. Ashby 3	J. Ximines, Rusk	3-28-31	Pumping
C. D. Ashby 4	J. Ximines, Rusk	6- 2-31	Pumping
Mayfield-Alford 1	J. Ximines, Rusk	1-31-31	Pumping
Mayfield-Alford 2	J. Ximines, Rusk	3-26-31	Pumping
Mayfield-Alford 3	J. Ximines, Rusk	5-23-31	Pumping
Harry W. Eliott et al			
E. B. Alford 1	I. G. Parker, Rusk	5-28-31	Pumping
A. J. Deason 1	J. Ximines, Rusk	4-25-31	Pumping
Elzey Drilling Co.-Tautenhahn			
W. M. Camp 1	J. Ximines, Rusk	3-28-31	Pumping
R. W. Fair & C. L. Thompson			
W. E. Wylie 1-A	J. Ximines, Rusk	7- 4-32	Dead
W. E. Wylie 2-A	J. Ximines, Rusk	7- 4-32	Dead
Wylie-Freeman 1-B	J. Ximines, Rusk	6-14-32	Dead
Wylie-Freeman 2-B	J. Ximines, Rusk	7-11-32	Dead
The Falcon Company			
T. O. Mason 6	J. B. Cadena, Rusk	11-20-31	Agit'ting
T. O. Mason 7	J. B. Cadena, Rusk	1- 7-32	Agit'ting
W. H. McCord 1	J. B. Cadena, Rusk	6-25-32	Pumping
Farley Drilling Co.			
Neal Cooper 1	T. J. Moore, Rusk	11-29-32	Pumping
Federated Oil Company			
W. M. Camp 1	J. Ximines, Rusk	3-29-31	Pumping
W. M. Camp 2	J. Ximines, Rusk	3-24-31	Pumping
W. M. Camp 3	J. Ximines, Rusk	4-25-31	Pumping
W. M. Camp 4	J. Ximines, Rusk	6- 2-31	Pumping
Mayfield-Alford 1	J. Ximines, Rusk	2-11-31	Pumping
Mayfield-Alford 2	J. Ximines, Rusk	3-15-31	Pumping
Mayfield-Alford 3	J. Ximines, Rusk	4-16-31	Pumping
Mayfield-Alford 4	J. Ximines, Rusk	5-10-32	Pumping
H. A. Fitzsimmons & Thomason			
E. B. Alford 1	I. G. Parker, Rusk	4-29-31	Pumping
Ford-Samples (E. R. Smith, Rec.)			
A. J. Deason 1	J. Ximines, Rusk	7- 9-31	Pumping
A. J. Deason 2	J. Ximines, Rusk	9-10-32	Pumping
Frank Foster Estate and Jeffries			
A. J. Deason 1	M. J. Pru, Rusk	. . . . .	Pumping
Frank Foster Est.-Jeffries & Kolp			
Mayfield-Alford 1-A	J. Ximines, Rusk	1-31-31	Pumping
Mayfield-Alford 2-A	J. Ximines, Rusk	3-29-31	Pumping
Mayfield-Alford 1-B	J. Ximines, Rusk	4- 2-31	Pumping
Mayfield-Alford 2-B	J. Ximines, Rusk	4- 3-31	Pumping
W. H. Gant & Garvin			
W. P. Moore 1	M. V. Pena, Rusk	7-22-32	Dead
W. P. Moore 2	M. V. Pena, Rusk	11- 3-32	Dead
W. P. Moore 3	M. V. Pena, Rusk	8-24-32	Dead
W. P. Moore 4	M. V. Pena, Rusk	10- 5-32	Dead
Jerry Simmons 1	M. V. Pena, Rusk	11-22-32	Swab'ing
Ellen Till 1	M. V. Pena, Rusk	4-19-32	Pumping
Gibson-Johnson & Merrick Drilling Co.			
C. D. Ashby 1	J. Ximines, Rusk	4-21-31	Pumping
Gilcrease Oil Co.			
D. Bradford 1	J. Ximines, Rusk	4-14-31	Pumping
D. Bradford 2	J. Ximines, Rusk	4-14-31	Pumping
D. Bradford 3	J. Ximines, Rusk	4-..-31	Pumping
D. Bradford 4	J. Ximines, Rusk	5-23-31	Agit'ting
Goodgame & Eby			
W. W. Holland 1	J. Lindley, Rusk	1- 4-32	Pumping
Gulf Prod. Co.			
H. Johnson 1	H. B. Dance, Rusk	12-11-31	Agit'ting
W. Shaw 2-A	F. Cordova, Rusk	8- 1-31	Swab'ing
O. L. Hastings & Dodson			
E. B. Alford 1	T. J. Moore, Rusk	9-18-32	Swab'ing
H. B. W. Oil Co.			
Redwine-Republic 1	J. Ximines, Rusk	12- 7-32	Dead
Heiden & Rogerson			
Barton-Birdwell 1	W. J. Tutt, Rusk	10-28-32	Dead
Hinchliffe-Holliday et al			
Sue Hale 1	J. Darley, Rusk	. . . . .	Agit'ting
Humble Oil & Refining Co.			
G. Alexander 1	T. H. Smith, Rusk	8-25-31	Gas lift
S. A. Glover 4	T. H. Smith, Rusk	2- 1-33	Gas lift
Eula McDavid 1	T. H. Smith, Rusk	8-25-31	Pumping
M. A. Neal 1	T. H. Smith, Rusk	11-18-32	Pumping
M. A. Neal 2	T. H. Smith, Rusk	1-28-33	Gas lift
Mary Smith 2-A	T. J. Martin, Rusk	6-14-33	Swab'ing
Hunt Production Company			
C. D. Ashby 1	J. Ximines, Rusk	1-22-31	Pumping
C. D. Ashby 2	J. Ximines, Rusk	2- 8-31	Pumping
C. D. Ashby 3	J. Ximines, Rusk	3- 1-31	Pumping
C. D. Ashby 4	J. Ximines, Rusk	2-25-31	Pumping
C. D. Ashby 5	J. Ximines, Rusk	3-18-31	Pumping
C. D. Ashby 6	J. Ximines, Rusk	4- 6-33	Pumping
D. M. Bradford 1-A	J. Ximines, Rusk	12-18-30	Pumping
D. M. Bradford 2-A	J. Ximines, Rusk	2-12-31	Pumping
D. M. Bradford 3-A	J. Ximines, Rusk	12-22-31	Pumping
D. M. Bradford 1-C	J. Ximines, Rusk	. . . . .	Pumping
D. M. Bradford 1-D	J. Ximines, Rusk	5-29-32	Pumping
D. M. Bradford 2-D	J. Ximines, Rusk	8-21-32	Pumping
D. M. Bradford 3-D	J. Ximines, Rusk	10-31-32	Pumping
D. M. Bradford 4-D	J. Ximines, Rusk	9- 5-32	Pumping
D. M. Bradford 5-D	J. Ximines, Rusk	9-21-32	Pumping
D. M. Bradford 6-D	J. Ximines, Rusk	12-12-32	Pumping
D. M. Bradford 7-D	J. Ximines, Rusk	3-12-33	Pumping
D. M. Bradford 1-E	J. Ximines, Rusk	5-10-32	Pumping
D. M. Bradford 2-E	J. Ximines, Rusk	6-17-32	Pumping
D. M. Bradford 1-F	J. Ximines, Rusk	11-19-32	Pumping
D. M. Bradford 2-F	J. Ximines, Rusk	12- 5-32	Pumping
D. M. Bradford 3-F	J. Ximines, Rusk	3-23-33	Pumping
W. M. Camp 1	J. Ximines, Rusk	3-19-31	Pumping
A. P. Finney 1	R. H. Penny, Rusk	4-12-31	Pumping
Sue Hale 1	J. Darley, Rusk	10-24-31	Pumping
Sue Hale 2	J. Darley, Rusk	5-20-32	Pumping
Sue Hale 3	J. Darley, Rusk	10-20-32	Pumping
Sue Hale 4	J. Darley, Rusk	11- 6-32	Pumping
Sue Hale 5	J. Darley, Rusk	11-10-32	Pumping
Sue Hale 6	J. Darley, Rusk	6-29-33	Pumping
Mayfield-Alford 1	J. Ximines, Rusk	3- 7-31	Pumping
V. E. Reid 4	T. J. Martin, Rusk	5-27-32	Pumping
V. E. Reid 5	T. J. Martin, Rusk	8-12-32	Pumping

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BALDWIN-DUCKWORTH CHAIN CORPORATION

SPRINGFIELD, MASSACHUSETTS

FACTORIES AT SPRINGFIELD AND WORCESTER, MASS.

Pumping and Dead Wells in the East Texas Fields—July 1, 1933

Owner and Well No.	Survey and County	Date Completed	Status
V. E. Reid 6	T. J. Martin, Rusk	11-11-32	Pumping
M. L. Thompson 1	M. J. Pru, Rusk	7- 6-31	Dead
R. J. Vinson 2	T. H. Smith, Rusk	12-12-31	Pumping
R. J. Vinson 3	T. H. Smith, Rusk	4-14-32	Pumping
R. J. Vinson 4	J. Darley, Rusk	10-25-32	Pumping
R. J. Vinson 5	J. Darley, Rusk	11-28-32	Pumping
A. B. Wocley 3	E. Collard, Rusk	3-23-32	Dead
Calvin Young 1	M. J. Pru, Rusk	4- 6-31	Dead
Calvin Young 2	M. J. Pru, Rusk	4-13-31	Dead
Calvin Young 3	M. J. Pru, Rusk	5- 6-31	Dead
Hunt Prod. Co.-Graddy Vaughn			
Calvin Young 1	M. J. Pru, Rusk	3-31-31	Swab'ing
Sherman Hunt et al			
R. J. Vinson 1	T. J. Moore, Rusk	4-27-32	Pumping
R. J. Vinson 2	T. J. Moore, Rusk	11-26-32	Pumping
Sherman Hunt and N. G. Landrum			
W. H. Frederick 1	I. G. Parker, Rusk	12-16-32	Pumping
Iowa Payne Oil Company			
W. H. Frederick 1	I. G. Parker, Rusk	12- 3-32	Pumping
Jenkins Oil Corporation			
D. M. Bradford 1	J. Ximines, Rusk	2-15-33	Pumping
Jenkins Oil Corp.-W. B. Hamilton-Consolidated			
W. M. Camp 1	J. Ximines, Rusk	2- 5-31	Pumping
W. M. Camp 2	J. Ximines, Rusk	3-17-31	Pumping
W. M. Camp 3	J. Ximines, Rusk	4- 4-31	Pumping
W. M. Camp 4	J. Ximines, Rusk	4- 8-31	Pumping
Wm. Jobe 1	J. Ximines, Rusk	3-17-31	Pumping
Wm. Jobe 2	J. Ximines, Rusk	3-28-31	Pumping
Wm. Jobe 3	J. Ximines, Rusk	4- 1-31	Pumping
Wm. Jobe 4	J. Ximines, Rusk	5-31-31	Pumping
Wm. Jobe 5	J. Ximines, Rusk	4- 2-31	Pumping
Wm. Jobe 6	J. Ximines, Rusk	4-10-31	Pumping
Wm. Jobe 7	J. Ximines, Rusk	6- 9-31	Pumping
Wm. Jobe 8	J. Ximines, Rusk	8-31-32	Pumping
Wm. Jobe 9	J. Ximines, Rusk	9-16-32	Pumping
Wm. Jobe 12	J. Ximines, Rusk	12- 9-32	Pumping
C. M. Joiner (E. R. Tennant, Rec.)			
D. M. Bradford 3 (Disc. well)	J. Ximines, Rusk	10- 3-30	Pump'g
D. M. Bradford 1-B	J. Ximines, Rusk	2-19-31	Pumping
D. M. Bradford 2-B	J. Ximines, Rusk	3-27-31	Pumping
D. M. Bradford 3-B	J. Ximines, Rusk	3-31-31	Pumping
D. M. Bradford 4-B	J. Ximines, Rusk	1-19-32	Pumping
D. M. Bradford 5-B	J. Ximines, Rusk	6-21-32	Pumping
D. M. Bradford 6-B	J. Ximines, Rusk	10-10-32	Pumping
D. M. Bradford 7-B	J. Ximines, Rusk	7- 6-32	Pumping
D. M. Bradford 8-B	J. Ximines, Rusk	11-18-32	Pumping
D. E. Killam & D. H. Gibbs			
W. M. Camp 1	J. Ximines, Rusk	11- 9-32	Pumping
Kimble & Acre			
E. B. Alford 1	I. G. Parker, Rusk	10-25-32	Pumping
E. B. Alford 2	I. G. Parker, Rusk	11-11-32	Pumping
K. & P. Oil Co. (Phillips)			
E. B. Alford 1	I. G. Parker, Rusk	4-23-31	Pumping
Leonard Petroleum Co.			
E. B. Alford 1	I. G. Parker, Rusk	4- 7-31	Pumping
Lion Oil Ref. Co.			
H. Brooks-Joiner 1-A	M. J. Pru, Rusk	3-24-31	Dead
H. Brooks-Joiner 3-A	M. J. Pru, Rusk	5-11-31	Dead
H. Brooks 6-B	M. J. Pru, Rusk	3- 6-32	Dead
Lively & Bryan			
W. M. Camp 1	J. Ximines, Rusk	3-28-31	Pumping
Cox 1	R. H. Penny, Rusk	4-16-31	Pumping
"Tex" Lloyd et al			
W. M. Camp 1	J. Ximines, Rusk	1- 9-31	Pumping
Luling Oil & Gas Co.			
E. B. Alford 1	I. G. Parker, Rusk	8- 4-31	Pumping
W. H. Frederick 1	J. Ximines, Rusk	4-10-31	Pumping
John E. Mabee, Inc.			
J. P. Maxwell 1	I. G. Parker, Rusk	7-25-31	Pumping
A. Thrash 1	J. Ximines, Rusk	3-19-31	Pumping
A. Thrash 2	J. Ximines, Rusk	3-24-31	Pumping
A. Thrash 3	J. Ximines, Rusk	9-14-32	Pumping
Magnolia Petroleum Co.			
G. W. Eaton 4	F. Cordova, Rusk	9- 7-31	Pumping
W. B. Kee 1	John Lindley, Rusk	4-29-31	Pumping
W. B. Kee 2	John Lindley, Rusk	9-16-32	Pumping
Dan Kelly 1	J. B. Cadena, Rusk	6-24-31	Pumping
Dan Kelly 2	J. B. Cadena, Rusk	9-30-31	Pumping
Dan Kelly 3	J. B. Cadena, Rusk	11- 8-31	Pumping
Dan Kelly 4	J. B. Cadena, Rusk	12-11-31	Pumping
Dan Kelly 5	J. B. Cadena, Rusk	1- 3-32	Pumping
Merrick Drilling Co. et al			
Neal Cooper 1	T. J. Moore, Rusk	4-25-31	Pumping

Pumping and Dead Wells in the East Texas Field—July 1, 1933

Owner and Well No.	Survey and County	Date Completed	Status
Neal Cooper 2	T. J. Moore, Rusk	10- 1-32	Pumping
Neal Cooper 3	T. J Moore, Rusk	12-16-32	Pumping
Mid-Kansas Oil & Gas Company			
Henry Clay 1	M. V. Pena, Rusk	5-21-32	Dead
Henry Clay 2	M. V. Pena, Rusk	7-28-32	Dead
Henry Clay 3	M. V. Pena, Rusk	7-14-32	Dead
Henry Clay 4	M. V. Pena, Rusk	8-13-32	Dead
Henry Clay 5	M. V. Pena, Rusk	10- 9-32	Dead
Henry Clay 6	M. V. Pena, Rusk	1-19-32	Dead
Henry Clay 7	M. V. Pena, Rusk	2- 1-33	Dead
M. M. Cross 9	E. B. Foulks, Cherokee	5-11-32	Pumping
M. M. Cross 12	E. B. Foulks, Rusk	5-25-32	Pumping
M. M. Cross 13	E. B. Foulks, Rusk	6-10-32	Pumping
M. M. Cross 19	E. B. Foulks, Rusk	7- 4-32	Pumping
H. L. Griffin 1	J. Ximines, Rusk	1- 8-32	Pumping
H. L. Griffin 2	J. Ximines, Rusk	5- 3-32	Pumping
H. L. Griffin 3	J. Ximines, Rusk	6- 8-32	Pumping
H. L. Griffin 4	J. Ximines, Rusk	6-27-32	Pumping
Joe Mills 1	J. B. Cadena, Rusk	8- 7-31	Dead
Joe Mills 2	J. B. Cadena, Rusk	9-10-31	Dead
Joe Mills 3	J. B. Cadena, Rusk	2- 4-32	Dead
Joe Mills 4	J. B. Cadena, Rusk	7- 8-32	Dead
Joe Mills 5	J. B. Cadena, Rusk	6-22-32	Dead
E. E. Moores 4	J. B. Cadena, Rusk	10-22-31	Dead
M. A. Price 8	J. B. Cadena, Rusk	7-27-32	Pumping
Robt. S. Monroe, Jr., et al			
D. Bradford 1	J. Ximines, Rusk	..-..-..	Pumping
H. S. Moss & Pete Urschel			
Mayfield-Alford 1	J. Ximines, Rusk	2-22-31	Pumping
Mayfield-Alford 2	J. Ximines, Rusk	5- 6-31	Pumping
Mullins & Strickland			
Brewer Cemetery 1	M. V. Pena, Rusk	4-22-32	Pumping
T. K. Murray-Davis-Rogers			
Darnell Bros. 1	H. B. Dance, Rusk	7-22-32	Dead
Murray Oil Co.-Top Oil Co.			
W. B. Kee-Moore 1	W. G. Tutt, Rusk	11-15-31	Pumping
Minor 1	W. G. Tutt, Rusk	10-31-31	Pumping
M. L. Priddy 1	W. G. Tutt, Rusk	10- 3-31	Dead
Moore 1	W. G. Tutt, Rusk	2- 1-32	Pumping
Teague 1	W. G. Tutt, Rusk	12- 3-31	Pumping
Nivla Oil Corp.-A. M. Sutton			
W. B. Brandon 1	W. G. Tutt, Rusk	8-15-32	Depleted
Maxie Wilson 1	J. Lindley, Rusk	9-16-31	Depleted
T. L. Odom et al			
W. M. Camp 1	J. Ximines, Rusk	..-..-..	Pumping
Ralph Ogden (Combined Oil Int.)			
Wm. Jobe-Dunklin 1	J. Ximines, Rusk	5-23-31	Pumping
Oil Properties Corp.			
E. B. Alford 1	I. G. Parker, Rusk	7- 4-32	Pumping
Pace Pet. Co.-L. G. Rabe			
J. C. Bateman 1	Jas. Jordan, Smith	9-25-32	Dead
Arch Page et al			
J. D. Florey 1	W. G. Tutt, Rusk	1-13-32	Dead
Pansy Oil Company			
E. B. Alford 1	T. J. Moore, Rusk	4- 8-32	Pumping
R. C. Parks et al			
W. H. Frederick 1	J. Ximines, Rusk	4-23-33	Pumping
Peery-C. W. Boller & Woody			
A. Thrash 1	J. Ximines, Rusk	4- 8-31	Dead
A. Thrash 2	J. Ximines, Rusk	4- 4-31	Dead
A. Thrash 3	J. Ximines, Rusk	4-17-31	Dead
A. Thrash 5	J. Ximines, Rusk	9-27-32	Dead
Petroleum Marketing Corp.			
Arnold-M. M. Barksdale 2	M. J. Pru, Rusk	6- 5-32	Pumping
W. M. Camp 1	J. Ximines, Rusk	3- 6-31	Pumping
W. H. Frederick 1	J. Ximines, Rusk	3-30-31	Pumping
Phillips & Bennett			
E. B. Alford 1	I. G. Parker, Rusk	2- 3-32	Pumping
Pilot Oil Company			
A. P. Finney 1	J. Ximines, Rusk	3- 5-31	Pumping
A. P. Finney 2	J. Ximines, Rusk	4-17-31	Pumping
A. P. Finney 3	J. Ximines, Rusk	4-13-31	Pumping
E. L. Pinkston et al			
E. L. Pinkston 1	J. Ximines, Rusk	6-16-33	Pumping
Restal Drilling Company			
E. Cooper 1	I. G. Parker, Rusk	12- 4-31	Pumping
J. P. Maxwell 1	I. G. Parker, Rusk	5- 6-31	Pumping
J. P. Maxwell 2	I. G. Parker, Rusk	4-27-32	Pumping
Richards & Watkins			
W. F. Neal 1	T. H. Smith, Rusk	9-22-32	Swab'ing
A. J. Rife et al			
C. C. Giles 1	M. J. Pru, Rusk	..-..-..	Dead
C. C. Giles 2	M. J. Pru, Rusk	11-30-32	Dead
M. Risinger et al			
M. H. Barton-Birdwell 1	W. G. Tutt, Rusk	12- 8-31	Pumping
D. C. Roberts et al			
E. B. Alford 1	I. G. Parker, Rusk	11- 5-32	Pumping
E. B. Alford 2	T. J. Moore, Rusk	5- 6-32	Pumping
Roberts Oil Corp. et al			
C. D. Ashby 1	J. Ximines, Rusk	2- 1-31	Pumping
Robertson Drilling Co.			
A. J. Deason 1	J. Ximines, Rusk	5-11-31	Pumping
Sam Roosth et al			
W. M. Camp 2	J. Ximines, Rusk	..-..-..	Pumping
Rusco Oil Company			
D. M. Bradford 1	J. Ximines, Rusk	1-26-31	Pumping
Floyd Scott, Rec. (C. B. Mitchell)			
W. H. Frederick 1	J. Ximines, Rusk	6-13-31	Swab'ing
Sentinel Oil Company			
S. S. Cook 1	J. Vargas, Smith	2- 8-32	Swab'ing
Sinclair Prairie Oil Company			
D. M. Bradford 1	J. Ximines, Rusk	4- 4-31	Pumping
D. M. Bradford 2	J. Ximines, Rusk	3-31-31	Pumping
W. W. Holland 1	J. Ximines, Rusk	2-27-31	Pumping
W. W. Holland 2	J. Ximines, Rusk	3- 3-31	Pumping
W. W. Holland 3	J. Ximines, Rusk	3- 5-31	Pumping
W. W. Holland 4	J. Ximines, Rusk	3-10-31	Pumping
W. W. Holland 5	J. Ximines, Rusk	3-27-31	Pumping
W. W. Holland 6	J. Ximines, Rusk	3-22-31	Pumping
W. W. Holland 7	J. Ximines, Rusk	3-28-31	Pumping
W. W. Holland 8	J. Ximines, Rusk	4- 3-31	Pumping
W. W. Holland 9	J. Ximines, Rusk	3-30-31	Pumping
W. W. Holland 10	J. Ximines, Rusk	6- 1-32	Pumping
W. H. McCord 4	J. B. Cadena, Rusk	6-23-32	Pumping
W. H. McCord 5	J. B. Cadena, Rusk	7- 4-32	Pumping
Amanda Wiley 1	Jas. Jordan, Smith	1- 7-32	Pumping
Amanda Wiley 7	Jas. Jordan, Smith	6- 7-32	Pumping
E. L. Smith Oil Company			
J. W. Wooley 1	T. H. Smith, Rusk	12-12-31	Pumping
J. O. Smith & Sikes			
W. H. Frederick 2	J. Ximines, Rusk	..-..-..	Pumping
Spandsco Oil & Royalty Co.			
E. B. Alford (Lot 33) 1	T. J. Moore, Rusk	4- 5-32	Pumping
E. B. Alford (Lot 43) 1	T. J. Moore, Rusk	4-30-32	Pumping
Spider Oil Company			
Florey-Neal 1	W. G. Tutt, Rusk	2-28-32	Dead
Sparkman & Reusch			
Stone-Mid-Continent 1	M. S. Coy, Cherokee	4-11-33	Pumping
Standard Pipe & Supply Co.			
W. P. Brett 2	M. J. Pru, Rusk	1- 1-32	Agit'ting
W. P. Brett 3	M. J. Pru, Rusk	2-28-32	Dead
Stanolind O&G Co.			
J. W. Ashby 1	Mary Walker, Rusk	12-13-32	Pumping
W. H. McCord 1	M. V. Pena, Rusk	7- 4-32	Pumping
Stanolind-Pure Oil Co.			
W. H. Siler 37	Mary Walker, Rusk	11-20-32	Gas lift
H. Stein et al			
L. L. Barton 1	W. G. Tutt, Rusk	..-..-..	Pumping
Stewart & Duffy			
Flo Gibson 1	W. G. Tutt, Rusk	2- 1-32	Pumping
H. O. Lawn 1	W. G. Tutt, Rusk	4- 1-32	Pumping
Stovall Drilling Co.-C. R. Tolbert			
J. P. Maxwell 1	I. G. Parker, Rusk	9-16-32	Pumping
Stroube & Stroube			
Frederick 1 (first pumper)	J. Ximines, Rusk	12-14-30	Pumping
Sunbeam Oil Company			
W. W. Brandon 1	W. G. Tutt, Rusk	12-17-31	Pumping
J. W. Kee-Republic 1	J. Lindley, Rusk	8-23-32	Pumping
Sun Oil Company			
R. J. Hendon 1	J. Ximines, Rusk	7-28-32	Pumping
R. J. Hendon 2	J. Ximines, Rusk	8-30-32	Pumping
R. J. Hendon 3	J. Ximines, Rusk	12-14-32	Pumping
R. J. Hendon 4	J. Ximines, Rusk	1-12-33	Pumping
R. J. Hendon 5	J. Ximines, Rusk	2- 2-33	Pumping
R. J. Hendon 6	J. Ximines, Rusk	3- 8-33	Pumping
R. J. Hendon 7	J. Ximines, Rusk	3-28-33	Pumping
Hodnett-Melton 4	M. S. Coy, Smith	5-20-33	Pumping
Ellen Till 1	M. V. Pena, Rusk	5-25-32	Pumping
Ellen Till 2	M. V. Pena, Rusk	6-16-32	Pumping
Ellen Till 3	M. V. Pena, Rusk	7- 8-32	Pumping
The Texas Company			
G. G. Turner 1	T. H. Smith, Rusk	7-10-31	Pumping
G. G. Turner 2	T. H. Smith, Rusk	..-..-..	Pumping
Thompson & Bean			
E. B. Alford 1	I. G. Parker, Rusk	6- 4-31	Pumping

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Sp-8-Jy

Pumping and Dead Wells in the East Texas Fields—July 1, 1933

Owner and Well No.	Survey and County	Date Completed	Status
Tide Water Oil Company			
Holland-Tolliver 1	J. Ximines, Rusk	3- 2-31	Pumping
Holland-Tolliver 2	J. Ximines, Rusk	4- 3-31	Pumping
O. Whittington 1	J. Darley, Rusk	1-18-32	Swab'ing
O. Whittington 2	J. Darley, Rusk	6-10-32	Swab'ing
O. Whittington 3	J. Darley, Rusk	11-22-32	Swab'ing
Trico Oil Company			
D. M. Bradford 1	J. Ximines, Rusk	2-26-33	Swab'ing
D. M. Bradford 2	J. Ximines, Rusk	6- 1-33	Swab'ing
A. J. Deason-Phillips 1	J. Ximines, Rusk	9- 1-31	Swab'ing
Dr. C. L. Tubbs et al			
J. H. Sharp 1	M. L. S. Coy, Cherokee	6-25-32	Swab'ing
Turman Oil Company			
R. Dark 2	M. J. Pru, Rusk	5-16-31	Agit'ting
Union Oil Company (Bert Shaw)			
C. D. Ashby 1-A	J. Ximines, Rusk	2- 5-31	Pumping
C. D. Ashby 1-B	J. Ximines, Rusk	3- 8-31	Pumping
C. D. Ashby 1-C	J. Ximines, Rusk	4- 6-31	Pumping
A. J. Deason 1	M. J. Pru, Rusk	4- 9-31	Pumping
Ventura Oil Company (Akin-Rayzor)			
C. D. Ashby 1	J. Ximines, Rusk	2-10-31	Pumping
Sam K. Vierson et al			
W. H. McCord 1	M. V. Pena, Rusk	6-14-32	Pumping
Virginia Oil Company			
J. H. Henson 1	J. Ximines, Rusk	12- 8-32	Pumping
Wainwright-West Oils, Ltd.			
W. M. Camp 1	J. Ximines, Rusk	2-15-31	Pumping
W. M. Camp 2	J. Ximines, Rusk	4- 2-31	Pumping
Watkins & Bunkerhill			
R. T. Neal 1	T. H. Smith, Rusk	..-..-..	Pumping
H. M. Welch et al			
W. M. Camp 1	J. Ximines, Rusk	2-11-32	Pumping
Westexas Oil & Royalty Corp.			
John Talley 1	J. Ximines, Rusk	4-24-31	Pumping
John Talley 2	J. Ximines, Rusk	3-29-31	Pumping
Zion Oil Company			
L. S. Sartain 1	Jas. Jordan, Smith	4-15-32	Dead
Nathan Pipe & Supply Company			
J. Lee-Big Indian 1	P. Tipps, Rusk	6-10-33	Pumping
KILGORE AREA			
Acme Oil Company			
J. S. & F. Elder 1	M. Van Winkle, Gregg	7-14-32	Pumping
Joe Anderson et al (T. P. McAdams, Rec.)			
G. Shaw 1	M. Van Winkle, Gregg	12- 4-32	Dead
Baggett & Byers			
Jerico Heroes 1	J. W. Bradshaw, Gregg	8-28-32	Dead
Baggett & Porter			
School Lot-Fort 1	W. P. Chism, Gregg	9-30-32	Agit'ting
F. A. Bates (Harper-Neff)			
E. T. Cole 1	E. M. Bramlet, Gregg	5-29-31	Dead
Boonie Oil Co.-Southern O&R Co.			
I&GN Ry. Fee 2	W. A. Elliott, Rusk	12-23-32	Dead
Bowles Oil Co.-Wheelock-Collins			
D. Wells 9	Hy. Hobson, Rusk	4-18-32	Pumping
Brooks & Clark			
Mayfield-Ephram 1	D. Clark, Rusk	4-18-32	Dead
D. M. Buffington et al			
S. Dansby 1	W. P. Chism, Gregg	1-22-33	Dead
J. T. Burlingame-Deep Sand Oil Co.			
H. E. Thomas 1	J. M. Morris, Gregg	10-27-32	Dead
H. E. Thomas 2	J. M. Morris, Gregg	2-27-33	Dead
Cameron Oil Company			
S. P. Warren 1	John Womack, Rusk	10- 6-31	Swab'ing
Caprock Oil & Gas Company			
N. Crane 1	M. Van Winkle, Gregg	10-20-32	Dead
B. F. Carroll et al			
C. Alexander 1	M. Van Winkle, Gregg	..-..-..	Pumping
Carroll & Blain			
King Bros. 1	M. Van Winkle, Gregg	8-22-32	Dead
Chas. Carroll & Taylor (J. C. Murphy)			
J. C. Gipson 1	Thos. Lloyd, Rusk	12-17-31	Pumping
E. L. Chapman (Dave Donoghue, Rec.)			
O. Russell 1	J. English, Rusk	6-23-31	Pumping
O. Russell 2	J. English, Rusk	8-29-31	Dead
Don Clery et al			
Chas. Arnold 1	W. H. Johnson, Gregg	.. .. ..	Pumping
Coman Cantwell, Rec.			
C. C. Crews 1	L. Perkins, Gregg	..-..-..	Pumping
J. E. Crosbie, Inc., et al			
Ella Camp 1	J. C. Barnett, Rusk	8-17-32	Dead
Crosbie-Nelson & Chrole			
D. Wade 1	D. Clark, Rusk	4- 6-32	Swab-ing
Crude Production Company			
Joe C. Gipson 1	Thos. Lloyd, Rusk	9-16-31	Pumping
Daniels & Sheppard			
W. P. Crews 1	J. W. Bradshaw, Gregg	2-28-33	Dead
R. H. Dearing & McBride			
J. M. Dickson 1	M. Van Winkle, Gregg	..-..-..	Dead
R. H. Dearing & Wallace			
Wallace 1	M. Van Winkle, Gregg	1-12-32	Dead

Pumping and Dead Wells in the East Texas Field—July 1, 1933

Owner and Well No.	Survey and County	Date Completed	Status
Deep Rock Oil Co.-Sam Raitman			
A. Z. Jeffrey 1	W. P. Chism, Gregg	10-22-31	Dead
Degener & Co., Inc.			
S. Bell 1	M. Van Winkle, Gregg	3-12-32	Pumping
Deininger-Moore-Zilkel-McMahon			
C. G. Strong 1	I. Beatty, Gregg	5-10-32	Pumping
Besse DeMayo et al			
Terrell-Tidal 1	E. G. Sevier, Rusk	9- 9-32	Dead
J. E. Devant et al			
R. H. Rowland 1	M. Van Winkle, Gregg	8-27-32	Pumping
R. H. Rowland 2	M. Van Winkle, Gregg	1-28-33	Pumping
Paul Doran et al			
Jackson-Sample 1	Jacob Taylor, Gregg	3-25-32	Pumping
East Texas Oil Ref. Co.			
M. Mayfield 1	D. Clark, Rusk	10-10-31	Pumping
E. & F. Petroleum Co.			
R. L. Williams 1	G. F. Penn, Gregg	6-17-32	Pumping
Harry W. Elliott-Joe Sullivan			
M. R. Terrell 1	A. M. Ryan, Rusk	5- 9-31	Dead
C. A. Everts Drilling Company			
B. M. Barton 1	M. Van Winkle, Gregg	12- 8-31	Pumping
B. M. Barton 2	M. Van Winkle, Gregg	7-14-32	Pumping
Starr Bailey School 1	D. Clark, Rusk	5- 1-32	Pumping
Knights of Tabor 1	Hy. Hobson, Rusk	3-20-32	Pumping
Elzey Drilling Company			
H. C. McNeely 1	W. P. Chism, Gregg	5-11-32	Pumping
Galvez Oil Corp.			
H. C. Alexander 1	M. Van Winkle, Gregg	5-..-31	Pumping
E. M. Gandy			
M. E. Church -	M. Van Winkle, Gregg	..-..-..	Dead
Graner Oil Company			
P. C. Warren 1	John Womack, Rusk	7-23-32	Ex'aust'd
Geo. Guthrie et al			
I. P. Perry 1	W. R. Cooke, (N) Rusk	7-29-31	Pumping
Harcher Oil Company			
R. H. Laird 1	M. Van Winkle, Gregg	7- 9-32	Dead
O. L. Hastings & Dodson			
J. Dickerson 1	M.Gogswell, Rusk	12-31-32	Swab'ing
Wallace 1	M. Van Winkle, Gregg	4-23-32	Dead
B. M. Hester et al			
C. C. Crews 1	L. Perkins, Gregg	3-23-32	Pumping
Humble Oil & Refining Co.			
C. H. Hedge 1	J. C. Barnett, Rusk	12-13-32	Pumping
J. A. Knowles 1	M. Van Winkle, Gregg	5-19-31	Agit'ting
J. A. Knowles 5	M. Van Winkle, Gregg	9- 2-31	Agit'ting
J. A. Knowles 7	M. Van Winkle, Gregg	9-23-31	Agit'ting
S. S. Laird 17-B	J. Lewis, Rusk	9-23-32	Swab'ing
S. S. Laird 25B	M. Van Winkle, Gregg	12-23-32	Swab'ing
S. S. Laird 26-B	M. Van Winkle, Gregg	12-16-32	Swab'ing
O. Roberson 2	D. Clark, Rusk	10-14-32	Pumping
Dora Thomas 1	M. Van Winkle, Gregg	11-10-31	Agit'ting
Dora Thomas 7	M. Van Winkle, Gregg	3-31-32	Agit'ting
J. C. Hurley et al			
M. B. Hughey 1	M. Van Winkle, Gregg	1-31-33	Pumping
Jackson & Eysenbach			
D. Florence 1	J. English, Rusk	5-12-32	Dead
J. & J. Pet. Corp.			
C. Wells 1	Jas. Morris, Gregg	7- 5-32	Dead
J. E. Johnston & Wyche			
J. V. Borders 1	M. Van Winkle, Gregg	7-28-31	Swab'ing
E. M. Jones et al			
L. D. Crim 1	M. Van Winkle, Gregg	3-19-33	Pumping
Kniveton Oil Company			
W. P. Crews 2	J. W. Bradshaw, Gregg	6- 6-32	Swab'ing
Lafayette Oil Corporation			
O. Roberson 1	T. Grace, Rusk	10-12-32	Dead
A. N. Landes et al			
M. B. Hughey 1	M. Van Winkle, Gregg	4- 2-32	Dead
H. H. LeMaster et al			
Mrs. F. Thompson 1	M. Van Winkle, Gregg	7-29-32	Dead
Louisiana Oil Ref. Corp.			
Mayfield 2	Hy. Hobson, Rusk	5-28-32	Pumping
Mayfield 4	Hy. Hobson, Rusk	7-15-32	Pumping
C. H. Lyons et al			
J. F. Richards-Shell 1	M. Van Winkle, Gregg	12-11-32	Pumping
Lion Oil Refining Co.			
A. A. King 4	M. Van Winkle, Gregg	9-27-32	Agit'ting
Magnolia Petroleum Company			
Alonzo Hicks 13	D. Dainwood, Gregg	12-28-33	Pumping
Jesse King 6	W. P. Chism, Gregg	12-14-32	Pumping
H. P. Hale 2	M. Van Winkle, Gregg	11-18-32	Pumping
H. P. Hale 3	M. Van Winkle, Gregg	2- 1-33	Pumping
R. H. Rowland 1	M. Van Winkle, Gregg	6-18-32	Agit'ting
R. H. Rowland 2	M. Van Winkle, Gregg	7-15-32	Agit'ting
R. H. Rowland 3	M. Van Winkle, Gregg	11-20 32	Pumping
Dick Wells 2	Hy. Hobson, Rusk	6- 2-31	Pumping
Dick Wells 3	Hy. Hobson, Rusk	6-12-31	Agit'ting
Dick Wells 5	Hy. Hobson, Rusk	9-17-31	Pumping
Dick Wells 6	Hy. Hobson, Rusk	11-28-32	Pumping
Martin & Company			
Trip Elder 1	M. Van Winkle, Gregg	11-21-31	Pumping
McW. McVey et al			
Baptist Church 1	M. Van Winkle, Gregg	..-..-..	Dead
Kelly Dickson 1	M. Van Winkle, Gregg	6-13-32	Dead
Mercury Petroleum Co.			
I&GN Ry. Fee 1	M. Van Winkle, Gregg	1-30-32	Swab'ing
Midfield Oil Co. (Badgett-Ward), J. M. Stevens, Rec.'s			
E. Samples-Holland 1	W. P. Chism, Gregg	12-11-31	Dead
John R. Murphy et al			
W. P. Crews 1	I. Batty, Gregg	8- 6-32	Dead
Navarro Oil Company			
E. G. Green 2	M. Van Winkle, Gregg	6- 9-32	Pumping
E. G. Green 3	M. Van Winkle, Gregg	7- 8-32	Pumping
Pace Petroleum Company			
Crim-Reynolds 1	M. Van Winkle, Gregg	1-31-32	Dead
A. C. Parker, Rec.			
Cumbi Wells 1	J. M. Morris, Gregg	..-..-..	Pumping
V. J. Pearson et al			
Elder-Butts 1	M. Van Winkle, Gregg	12-13-32	Dead
H. E. Preston et al			
W. P. Crews 2	J. W. Bradshaw, Gregg	..-..-..	Dead
Producers Investment Corp.			
Rowland 1	M. Van Winkle, Gregg	7- 2-32	Dead
Roy Reynolds-Solar Exploration Co.			
J. S. & F. Elder 1	M. Van Winkle, Gregg	4-28-32	Air lift
J. S. & F. Elder 2	M. Van Winkle, Gregg	7-29-32	Air lift
J. S. & F. Elder 3	M. Van Winkle, Gregg	8-19-32	Air lift
J. I. Roberts et al			
Elder-Dunn 1	M. Van Winkle, Gregg	9-30-32	Pumping
Royal Petroleum Corp. (was E. B. Madden)			
M. Mayfield 1	D. Clark, Rusk	6-20-31	Pumping
Max Rubin & J. Beren			
Abe Holt-Shell 2	D. Clark, Rusk	7- 8-32	Pumping
Russell Petroleum Corp.			
M. T. Cole 1	J. A. Duncan, Gregg	9-16-32	Dead
M. T. Cole 2	J. A. Duncan, Gregg	10-10-32	Dead
E. Duncan 1	M. Van Winkle, Gregg	7-26-32	Dead
A. A. King 1	M. Van Winkle, Gregg	8-19-32	Dead
Morton-Dickson 1	M. Van Winkle, Gregg	4-14-32	Pumping
Harry Schulman et al			
Jim Dorris 1	M. Van Winkle, Gregg	10-21-32	Pumping
S. & D. Petroleum Co.			
F. D. Oberthier 1	M. Van Winkle, Gregg	9- 8-32	Agit'ting
Shell Petroleum Corporation			
Abe Holt 1	D. Clark, Rusk	6-12-31	Pumping
T. Wells 2-A	Hy. Hobson, Rusk	6-29-32	Pumping
T. Wells 1-B	D. Clark, Rusk	4-27-32	Pumping
Sinclair Prairie Oil Co.			
Major Kennedy 1-A	Hy. Hobson, Rusk	8-25-31	Pumping
A. A. King 1-C	E. H. Angell, Gregg	8-22-32	Pumping
J. E. Lawther 1	M. Garrett, Gregg	12-23-31	Pumping
J. E. Lawther 8	M. Garrett, Gregg	6- 9-32	Pumping
J. E. Lawther 9	M. Garrett, Gregg	6-22-32	Pumping
J. E. Lawther 10	M. Garrett, Gregg	10- 1-32	Pumping
Vic C. Smith et al (A. L. Slaughter, Rec.)			
L. Alexander 1	M. Van Winkle, Gregg	2-20-32	Dead
J. A. Knowles 1	M. Van Winkle, Gregg	5-10-32	Dead
Solar Exploration Co.			
H. H. Leach 1	J. C. Barnett, Rusk	5-20-32	Dead
M. Spalding et al			
W. P. Crews 1	J. W. Bradshaw, Gregg	9-27-32	Pumping
H. K. Spear et al			
C. Alexander 1	M. Van Winkle, Gregg	12-20-31	Pumping
J. M. Dickson 1	M. Van Winkle, Gregg	7-10-32	Pumping
State Production Co.			
J. C. Gipson 1	Thos. C. Lloyd, Rusk	9-25-31	Pumping
Stedham & Thrasher			
B. D. Russell 1	M. Van Winkle, Gregg	3- 1-33	Pumping
Sun Oil Company			
Ed. Barker 1	A. M. Ryan, Rusk	7-22-32	Pumping
Ed. Barker 2	A. M. Ryan, Rusk	7-22-32	Pumping
E. L. Walker 1	E. W. Friar, Gregg	8-21-31	Pumping
Tide Water Oil Co.			
J. E. Choice 1	W. P. Chism, Gregg	6-20-31	Pumping
J. S. & F. Elder 1	M. Van Winkle, Gregg	8-10-32	Pumping
J. S. & F. Elder 2	M. Van Winkle, Gregg	1-27-33	Pumping
Titan Oil Company			
C. M. Dickson 1	J. Hillard, Gregg	10- 4-32	Pumping
C. M. Dickson 2	J. Hillard, Gregg	1- 5-33	Pumping
T. J. Tucker et al			
Mary Rufus 1	M. Van Winkle, Gregg	6- 2-32	Pumping
W. C. Turnbow Petroleum Co.			
Dixon 1	I. Batty, Gregg	8-31-32	Dead
J. T. Florence 1	M. Van Winkle, Gregg	6-11-32	Pumping
J. A. Knowles 1	M. Van Winkle, Gregg	8-30-32	Dead
Wainwright-West Oils, Ltd.			
J. M. Martin 1	J. Taylor, Gregg	4-26-32	Pumping

Pumping and Dead Wells in the East Texas Field—July 1, 1933

Owner and Well No.	Survey and County	Date Completed	Status
Wheelock & Collins			
Wm. Clayton 5	L. B. Outlaw, Gregg	6-27-32	Swab'ing
Dick Wells 4	Hy. Hobson, Rusk	11-17-31	Pumping
LONGVIEW AREA			
Abernathy-T. A. Johnson & Victory			
Mrs. A. M. Greggston 1	M. Dillard, Gregg	4-20-32	Pumping
H. L. Allen et al			
M. Bonner 1	Jas. McRae, Gregg	7- 6-32	Pumping
Alma Pet. Corp.			
J. W. L. Younce 1	H. R. Hokit, Upshur	8-23-31	Swab'ing
Arkansas Fuel Oil Co.			
G. A. Castleberry 2	D. Sanchez, Gregg	11-25-31	Pumping
C. L. Brown et al			
D. C. Shelton-Humble 1	Wm. King, Upshur	12-11-31	Pumping
California Petroleum Corp.			
D. Culpepper 1	Wm. King, Upshur	11-28-31	Pumping
J. W. Clark et al			
E. H. Hamilton 1	M. Chandler, Upshur	7-30-31	Pumping
Columbia O&G Co.			
G. A. Castleberry 1	D. Sanches, Gregg	12- 3-31	Pumping
Cranfill-Reynolds Co. et al			
M. L. Rash 1	E. N. Eubanks, Upshur	1-29-32	Dead
Danciger O&R Co.			
Mrs. G. S. Maddox 1	D. Sanches, Gregg	4-28-32	Dead
Mrs. G. S. Maddox 2	D. Sanches, Gregg	5-17-32	Dead
Darby Petroleum Co.			
C. C. Clements 2	D. Sanches, Gregg	2-10-32	Dead
Dean & A. Adkisson			
O. M. Victory 3	E. A. J. Evans, Upshur	7-23-32	Pumping
W. A. Delaney-Clark-Cowden			
C. C. Clemons 1	D. Sanches, Gregg	5-15-31	Dead
Dolores Oil Corp.			
G. S. Maddox 2	D. Sanches, Gregg	5- 1-32	Agit'ting
East Mountain Prod. Co.			
C. T. Shelton-Humble 1	Wm. King, Upshur	9-10-32	Pumping
East Texas Oil Ref. Co.			
W. L. Fuller 1	D. Sanches, Gregg	12-15-31	Pumping
Faith Oil Corporation			
E. H. Brawley 1	J. Crouch, Upshur	6-14-32	Pumping
Flanagan Prod. Co.-C. S. Bazzell			
J. H. Thomas 1	H. F. Rogers, Gregg	5-28-32	Pumping

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of the Well Known Book

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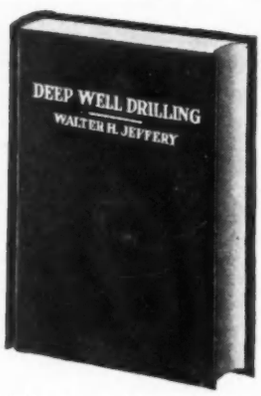
by **WALTER H. JEFFERY**



Re-written, revised, and enlarged by the addition of the following New Chapters:

Geophysical Prospecting and Air Mapping.

Straight Hole Drilling and the Treatment of Crooked Holes.

Water Supply.

The Gas-Air Lift Method of Producing Oil.

A. P. I. Codes.

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3301 BUFFALO DRIVE HOUSTON, TEXAS

Owner and Well No.	Survey and County	Date Completed	Status
Granite Oil Company			
Victory 1	E. A. J. Evans, Upshur	10-19-31	Dead
Heydrick-Camp Drilling Co.			
D. C. Shelton 1	Wm. King, Upshur	11-18-32	Dead
Humble Oil & Refining Co.			
Eve O'Byrne 1-C	J. R. Watkins, Upshur	10-12-31	Pumping
Idaho Oil Corp-Glasscock			
East Mt. Baptist Church 1	Wm. King, Upshur	3- 6-32	Pumping
Jones & Snopsky			
E. M. Bramlette 1	D. Sanches, Gregg	1-19-33	Pumping
Lynch-Newman & V. O. E. Wright			
L. T. Mackey-Humble 1	S. Harrell, Upshur	1-28-33	Dead
Maddox Dev. Co.			
Willie Starr 1	Chas. Cooper, Upshur	6-29-32	Pumping
Magnolia Petroleum Company			
Mattie Dyer 2	H. Hathaway, Gregg	9- 3-31	Agit'ting
H. Fenton 1	Wm. King, Upshur	12-18-31	Swab'ing
H. Fenton 2	Wm. King, Upshur	1-14-32	Swab'ing
H. Fenton 3	Wm. King, Upshur	6-25-32	Swab'ing
Hobart Keys 1	John Ruddle, Gregg	9-26-31	Pumping
Hobart Keys 2	John Ruddle, Gregg	4- 9-32	Pumping
A. M. Kinsell 2	H. W. Kirk, Gregg	2-17-33	Pumping
L. E. Orms 1	W. H. Castleberry, Gregg	9-20-31	Agit'ting
B. E. Rodden 3	Wm. Robinson, Gregg	4-14-31	Swab'ing
B. E. Rodden 4	Wm. Robinson, Gregg	4-11-31	Swab'ing
B. E. Rodden 5	Wm. Robinson, Gregg	4-17-31	Swab'ing
B. E. Rodden 7	Wm. Robinson, Gregg	5- 9-32	Pumping
Laura Walker 2	D. Sanches, Gregg	10- 5-31	Pumping
Mar-La-Fay Oil Corp.			
H. P. Phillips 1	H. R. Hokit, Upshur	8-10-32	Pumping
Marlin Oil Syndicate			
Spring Hill School 1	D. Sanches, Gregg	4-30-31	Dead
J. A. McCartney, Rec. (Waggoner-McConnell)			
Jim Williams 4	McKinney-Williams, Upshur	3-15-33	Dead
A. D. Morten et al			
Clinton Hensley 1	J. Ruddle, Gregg	12-19-31	Dead
Mullendore & Berry			
M. Magrill 1	D. Sanches, Gregg	..-..-..	Dead
J. F. Murphy et al			
A. J. Watkins 1	J. M. Pineda, Upshur	9- 8-31	Pumping
Nathan Pipe & Supply (Ransom-Sheppard)			
Stiles 1	Wm. King, Upshur	10-25-32	Pumping
John F. O'Connell et al			
Richey 1	M. Dillard, Gregg	..-..-..	Dead
J. P. Patty & Tarrant			
McComic 1	M. Dillard, Gregg	9-20-32	Pumping
W. H. Peckham Oil Co.			
E. H. Hamilton 1	Wm. King, Upshur	8-26-32	Pumping
Ray Drilling Co.			
A. H. Tubbs 1	D. Sanches, Gregg	5-29-33	Pumping
A. H. Tubbs 2	D. Sanches, Gregg	5-29-33	Pumping
A. H. Tubbs 4	D. Sanches, Gregg	1-24-33	Pumping
A. H. Tubbs 5	D. Sanches, Gregg	2- 3-33	Pumping
A. H. Tubbs 6	D. Sanches, Gregg	3-19-33	Pumping
J. Nye Ryman, Trustee (Weaver et al)			
L. B. Miller-Humble 1	Wm. King, Upshur	8- 1-32	Pumping
J. Nye Ryman, Trustee (Weaver et al)			
L. J. Everett 1	Wm. Goodwin, Upshur	6-27-31	Pumping
Rockland-Saturn Oil Co.			
W. E. Smith 1	J. M. Pineda, Upshur	6- -32	Pumping
Service Drl. & Roy. Corp.			
Free-Humble 1	Wm. King, Upshur	6-22-32	Pumping
Free-Humble 2	Wm. King, Upshur	9- 5-32	Pumping
W. F. Sorrels & Owens			
A. N. Brawley 1	M. Mann, Upshur	2- 9-32	Pumping
J. W. Free 1	Wm. King, Upshur	6-27-32	Pumping
W. M. Shriver-Johnson (H. Davis, Rec.)			
J. Hargraves 1	Wm. King, Upshur	10-30-31	Pumping
Simms Oil Co.-Stanolind O&G Co.			
G. B. Tenery 1	Wm. Robinson, Gregg	3-29-31	Agit'ting
Skipper-Bivins Oil Co.			
Maggie Magrill 1	D. Sanches, Gregg	4-14-31	Dead
E. L. Smith Oil Co.			
E. A. Watts 1	C. H. Cooper, Upshur	9-18-32	Agit'ting
Sun Oil Co.			
J. C. Gray 2	D. Sanches, Gregg	1-26-32	Pumping
J. C. Gray 7	D. Sanches, Gregg	7- 6-32	Pumping
J. C. Gray 9	D. Sanches, Gregg	11-19-32	Pumping
T. G. Pressley 2	M. Alexander, Gregg	12-17-32	Pumping
M. Taxman et al			
A. Callahan 1	E. A. J. Evans, Upshur	7- 4-31	Pumping
The Texas Co.			
H. L. Phillips 3	D. B. Choate-Hokit, Gregg	6-19-32	Pumping
Tide Water Oil Co.			
J. J. Castleberry 7	D. Sanches, Gregg	4- 3-32	Pumping
Ty-Tex Oil & Dev. Co.			
S. F. Kay 1	H. W. Augustine, Upshur	11-10-31	Pumping
Yount-Lee Oil Co.			
F. K. Lathrop 6-C	Wm. Robinson, Gregg	10-17-32	Pumping

BUYERS' GUIDE

East Texas Pumping Equipment

The BUYERS' GUIDE is a directory to manufacturers of pumping equipment and has been compiled with the cooperation of manufacturers for the convenience of those who are purchasing and will be purchasing equipment for East Texas. Only major classifications of equipment have been included. While every effort has been made to insure the correctness of the guide the publishers can not be responsible for omissions or errors.

EQUIPMENT HAS BEEN LISTED UNDER THE FOLLOWING MAJOR CLASSIFICATIONS IN THE ORDER SHOWN: Pumping Powers, Central—Pumping Jacks—Shackle Rods and Shackle Rod Accessories—Pumping Units (Individual or Multiple)—Lifting Systems (Special)—Pumping Engines (Internal Combustion)—Pumping Motors (Electrical)—Compressors—Pumping Belts—Pumping Derricks—Standard Rigs—Walking Beams—Walking Beam Accessories—Counterbalances—Tubing Blocks—Tubing Catchers—Tubing Elevators—Tubing Heads—Sucker Rods—Sucker Rod Accessories—Sucker Rod Tools—Working Barrels—Pumps and Pump Accessories—Sand Pumps—Dynamometers—Pulling Machines—Cups.

PUMPING POWERS—Central:

Allis-Chalmers Manufacturing Company, Milwaukee, Wisc.
Bridgeport Machine Company, Wichita, Kansas.
The Continental Supply Company, 1501 Locust Street, St. Louis, Mo.
Fairbanks, Morse & Company, 900 S. Wabash Ave., Chicago, Ill.
The Falk Corporation, Milwaukee, Wis.
Frick-Reid Supply Corp., Tulsa, Okla.
Hercules Supply Company, Ft. Worth, Texas.
Jarecki Manufacturing Company, 721 Olive St., St. Louis, Mo.
LeRoi Company, Milwaukee, Wis.
Lufkin Foundry & Machine Company, Lufkin, Texas.
Marion Machine, Foundry & Supply Company, Marion, Indiana.
The National Supply Companies, Toledo, Ohio.
Oil Field Engineering Corporation, Ft. Worth, Texas.
Oil Well Supply Company, Dallas, Texas.
The Pattin Bros. Company, Marietta, Ohio.
Joseph Reid Gas Engine Company, Oil City, Penna.
The Titusville Iron Works Company, Titusville, Penna.
Westinghouse Electric & Manufacturing Company, East Pittsburgh, Penna.

PUMPING JACKS:

Allis-Chalmers Manufacturing Company, Milwaukee, Wis.
Alten's Foundry & Machine Works, Lancaster, Ohio.
The American Crane Company, Friendship, N. Y.
Atlas Supply Company, Muskogee, Okla.
Bridgeport Machine Company, Wichita, Kansas.
The Cason Company, M. & M. Building, Houston, Texas.
The Continental Supply Company, 1501 Locust St., St. Louis, Mo.
Franks Manufacturing Company, Box 1174, Tulsa, Okla.
Frick-Reid Supply Corp., Tulsa, Okla.
B. G. Goble Manufacturing Company, Tulsa, Okla.
Hercules Supply Company, Ft. Worth, Texas.
Houston Oilfield Material Company, 1816 Nance St., Houston, Texas.
The International Derrick & Equipment Company, Columbus, Ohio.
International Supply Company, Tulsa, Okla.
Jarecki Manufacturing Company, 721 Olive St., St. Louis, Mo.
Jensen Bros. Manufacturing Company, P. O. Box 220, Tyler, Texas.
Kirk-Morrow Iron Works, Inc., Iola, Kansas.
Lucey Products Corporation, 224 E. Brady, Tulsa, Okla.
Lufkin Foundry & Machine Company, Lufkin, Texas.
Marion Machine, Foundry & Supply Co., Marion, Ind.
The National Supply Companies, Toledo, Ohio.
Norris Bros., Inc., Robinson, Ill.
W. C. Norris Manufacturer, Box 1188, Tulsa, Okla.
Norvell-Wilder Supply Company, Beaumont, Texas.
Oil Equipment Sales Corp., Houston, Texas.
Oil Well Supply Company, Dallas, Texas.
Porter Sales Company, 216 Thompson Bldg., Tulsa, Okla.
Republic Supply Company, Petroleum Bldg., Houston, Texas.
Rex Supply Company, Sour Lake, Texas.
Texas Steel Company, Ft. Worth, Texas.
Union Machine Company, Bartlesville, Okla.
Union Supply Corp., Sulphur Mine, La.
Wise Machine Company, Butler, Pa.
Young Engine Corporation, P. O. Box 532, Canton, Ohio.

SHACKLE RODS AND SHACKLE ROD ACCESSORIES:

Alten's Foundry & Machine Works, Lancaster, Ohio.
American Iron & Machine Works Company, Oklahoma City, Okla.
Atlas Supply Company, Muskogee, Okla.
The Continental Supply Company, 1501 Locust St., St. Louis, Mo.
Hercules Supply Company, Ft. Worth, Texas.
The S. M. Jones Company, Toledo, Ohio.
Marion Machine, Foundry & Supply Company, Marion, Indiana.
The National Supply Company, Toledo, Ohio.
Norris Bros., Inc., Robinson, Ill.
W. C. Norris Manufacturer, Box 1188, Tulsa, Okla.
Norvell-Wilder Supply Company, Beaumont, Texas.
Oil Well Supply Company, Dallas, Texas.
Petroleum Equipment Company, Ft. Worth, Texas.
Joseph Reid Gas Engine Company, Oil City, Pa.
Republic Supply Company, Petroleum Bldg., Houston, Texas.
Rex Supply Company, Sour Lake, Texas.
Texas Steel Company, Ft. Worth, Texas.
Union Supply Corp., Sulphur Mine, La.

PUMPING UNITS — Individual or Multiple:

Allis-Chalmers Manufacturing Company, Milwaukee, Wis.
Alten's Foundry & Machine Works, Lancaster, Ohio.
The American Crane Co., Friendship, N. Y.
The American Well Works, Aurora, Ill.
Bridgeport Machine Company, Wichita, Kansas.
Butler Engine & Foundry Company, 151 S. Monroe Street, Butler, Penna.
Cameron Iron Works, Inc., 711 Milby St., Houston, Texas.
The Cason Company, M. & M. Building, Houston, Texas.
The Continental Supply Company, 1501 Locust St., St. Louis, Mo.
The Falk Corporation, Milwaukee, Wis.
Gardner-Denver Company, Quincy, Ill.
Hercules Supply Company, Ft. Worth, Texas.
The International Derrick & Equipment Company, Columbus, Ohio.
Jensen Bros. Manufacturing Company, P. O. Box 220, Tyler, Texas.
Link-Belt Company, 910 S. Michigan Avenue, Chicago, Ill.
Lucey Products Corp., 224 E. Brady, Tulsa, Okla.
Lufkin Foundry & Machine Company, Lufkin, Texas.
Marion Machine, Foundry & Supply Company, Marion, Indiana.
Lee C. Moore and Company, Inc., Neville Island Branch, Pittsburgh, Pa.
The National Supply Companies, Toledo, Ohio.

PUMPING EQUIPMENT BUYERS' GUIDE

W. C. Norris Manufacturer, Box 1188, Tulsa, Okla.
The OCS Manufacturing Company, Coffeyville, Kansas.
Oil Well Supply Company, Dallas, Texas.
The Parkersburg Rig & Reel Company, Parkersburg, W. Va.
The Pattin Bros. Company, Marietta, Ohio.
Pelican Well Tool & Supply Company, Shreveport, La.
Petroleum Equipment Company, Fort Worth, Texas.
Petroleum Iron Works Company, Beaumont, Texas.
J. P. Ratigan, 1213 Santa Fe Ave., Los Angeles, Calif.
Rotating Pumper Company, 1333 Santa Fe Ave., Los Angeles, Calif.
Sullivan Machinery Company, 400 No. Michigan Ave., Chicago, Ill.
Wheatley Bros., Tulsa, Okla.
Wise Machine Company, Butler, Pa.
Young Engine Corporation, P. O. Box 532, Canton, Ohio.

LIFTING SYSTEMS — Special — Other Than Customary Pumping:

Halliburton Oil Well Cementing Company, Duncan, Okla.
Hercules Supply Company, Ft. Worth, Texas.
Hughes Tool Company, Houston, Texas.
Marion Machine, Foundry & Supply Company, Marion, Indiana.
Mission Manufacturing Company, 2422 Railroad Ave., Houston, Texas.
The National Supply Companies, Toledo, Ohio.
Oil Well Flow-Meter Corp., Philcade Bldg., Tulsa, Okla.
Oil Well Supply Company, Dallas, Texas.
Petroleum Equipment Company, Fort Worth, Texas.
Porter Sales Company, 216 Thompson Bldg., Tulsa, Okla.
Reda Pump Company, Bartlesville, Okla.
The Shaffer Specialty Company, Box 136, Whittier Station, Tulsa, Okla.
Southern States Company, Inc., 929 Slattery Bldg., Shreveport, La.
W-K-M Company, 220 Roberts St., Houston, Texas.
Western Pneumatic Company, 2121 Alamo Natl. Bk. Bldg., San Antonio, Texas.

PUMPING ENGINES—Internal Combustion:

Atlas Supply Company, Muskogee, Okla.
Bridgeport Machine Company, Wichita, Kansas.
The Buda Company, Harvey, Ill.
Butler Engine & Foundry Company, 151 S. Monroe Street, Butler, Penna.
Caterpillar Tractor Company, Peoria, Ill.
Clark Bros. Co., Olean, N. Y.
Climax Engineering Company, Clinton, Iowa.
Continental Motors Corp., Detroit, Mich.
The Continental Supply Company, 1501 Locust St., St. Louis, Mo.
The Cooper-Bessemer Corporation, Mt. Vernon, Ohio.
Fairbanks, Morse & Company, 900 S. Wabash Ave., Chicago, Ill.
Franklin Valveless Engine Company, Franklin, Penna.
Frick-Reid Supply Corp., Tulsa, Okla.
Fulton Iron Works Company, St. Louis, Mo.
Hercules Motors Corporation, Canton, Ohio.
Hercules Supply Company, Ft. Worth, Texas.
Ingersoll-Rand Company, 11 Broadway, New York, N. Y.
The International Derrick & Equipment Company, Columbus, Ohio.
International Harvester Company, Chicago, Ill.
International Supply Company, Tulsa, Okla.
LeRoi Company, Milwaukee, Wis.
Lucey Products Corporation, 224 E. Brady, Tulsa, Okla.
Marion Machine, Foundry & Supply Company, Marion, Indiana.
Muncie Oil Engine Company, Muncie, Indiana.
The National Supply Companies, Toledo, Ohio.
National Transit Pump & Machine Company, Oil City, Penna.
Norvell-Wilder Supply Company, Beaumont, Texas.
Oil Well Supply Company, Dallas, Texas.
The Pattin Bros. Company, Marietta, Ohio.
Pelican Well Tool & Supply Company, Shreveport, La.
Joseph Reid Gas Engine Company, Oil City, Pa.
Republic Supply Company, Petroleum Bldg., Houston, Texas.
Rotating Pumper Company, 1333 Santa Fe Ave., Los Angeles, Calif.
The Titusville Iron Works Company, Titusville, Penna.
Waukesha Motor Company, Waukesha, Wis.
Wise Machine Company, Butler, Pa.
Worthington Pump & Machine Corporation, Harrison, N. Y.
Young Engine Corporation, P. O. 532, Canton, Ohio.

PUMPING MOTORS—Electrical:

Allis-Chalmers Manufacturing Company, Milwaukee, Wis.
The Louis Allis Company, 427 E. Stewart Street, Milwaukee, Wis.
Bridgeport Machine Company, Wichita, Kansas.
John A. Coleman, 1006 Washington Ave., Houston, Texas.
Continental Electric Company, Newark, N. J.
The Continental Supply Company, 1501 Locust St., St. Louis, Mo.
Fairbanks, Morse & Company, 900 S. Wabash Ave., Chicago, Ill.
Frick-Reid Supply Corp., Tulsa, Okla.
General Electric Company, 1 River Road, Schenectady, N. Y.
Hercules Supply Company, Fort Worth, Texas.
Lacy Company, Petroleum Bldg., Houston, Texas.
Lucey Products Corporation, 224 E. Brady, Tulsa, Okla.
Lufkin Foundry & Machine Company, Lufkin, Texas.
The National Supply Companies, Toledo, Ohio.
Norvell-Wilder Supply Company, Beaumont, Texas.
Oil Well Supply Company, Dallas, Texas.
The Parkersburg Rig & Reel Company, Parkersburg, W. Va.
Pelican Well Tool & Supply Company, Shreveport, La.
Wagner Electric Corp., 6400 Plymouth Ave., St. Louis, Mo.
Westinghouse Electric & Manufacturing Co., East Pittsburgh, Penna.

COMPRESSORS:

Allis-Chalmers Manufacturing Company, Milwaukee, Wis.
Atlas Supply Company, Muskogee, Okla.
Chicago Pneumatic Tool Company, New York, N. Y.
Clark Bros. Co., Olean, N. Y.
The Continental Supply Company, 1501 Locust St., St. Louis, Mo.
The Cooper-Bessemer Corporation, Mt. Vernon, Ohio.
Fairbanks, Morse & Company, 900 S. Wabash Ave., Chicago, Ill.
Gardner-Denver Company, Quincy, Ill.
Hercules Supply Company, Fort Worth, Texas.
Ingersoll-Rand Company, 11 Broadway, New York, N. Y.
The National Supply Companies, Toledo, Ohio.
National Transit Pump & Machine Company, Oil City, Penna.
Oil Well Supply Company, Dallas, Texas.
The Pattin Bros. Company, Marietta, Ohio.
Schramm, Inc., Chester, Pa.
Sullivan Machinery Company, 400 No. Michigan Ave., Chicago, Ill.
Worthington Pump & Machine Corporation, Harrison, N. Y.

PUMPING BELTS:

Allis-Chalmers Manufacturing Company, Milwaukee, Wis.
Atlas Supply Company, Muskogee, Okla.
Bridgeport Machine Company, Wichita, Kansas.
Chicago Belting Company, 125 North Green St., Chicago, Ill.
Cincinnati Rubber Manufacturing Company, Cincinnati, Ohio.
The Continental Supply Company, 1501 Locust Street, St. Louis, Mo.
The Dayton Rubber Manufacturing Company, Dayton, Ohio.
Diamond Rubber Company, Akron, Ohio.
R & J Dick Company, Inc., Passaic, N. J.
Fenwick - Reddaway Manufacturing Company, Newark, N. J.
Frick-Reid Supply Corp., Tulsa, Okla.
Gandy Belting Company, 251 Pearl Street, Grand Rapids, Mich.
The Gates Rubber Company, 999 So. Broadway, Denver, Colo.

PUMPING EQUIPMENT BUYERS' GUIDE

General Electric Company, 1 River Road, Schenectady, N. Y.
L. H. Gilmer Company, Tacony, Philadelphia, Pa.
The B. F. Goodrich Rubber Company, Akron, Ohio.
Goodyear Tire & Rubber Co., Inc., Akron, Ohio.
The Gustin Bacon Manufacturing Company, 1412 W. 12th Street, Kansas City, Mo.
Happy Belting Company, Tulsa, Okla.
Hercules Supply Company, Fort Worth, Texas.
Hewitt Gutta Percha Rubber Corporation, 240 Kensington Ave., Buffalo, N. Y.
Hinderliter Tool Company, Drawer 2650, Tulsa, Okla.
Lucey Products Corporation, 224 E. Brady, Tulsa, Okla.
Lufkin Foundry & Machine Company, Lufkin, Texas.
Manheim Manufacturing & Belting Company, Manheim, Penna.
Marion Machine, Foundry & Supply Company, Marion, Indiana.
The National Supply Companies, Toledo, Ohio.
New York Rubber Corporation, 19 West 44th St., New York, N. Y.
Norvell-Wilder Supply Company, Beaumont, Texas.
Oil Well Supply Company, Dallas, Texas.
Pelican Well Tool & Supply Company, Shreveport, La.
Quaker City Rubber Company, Philadelphia, Pa.
The Republic Rubber Company, Youngstown, Ohio.
Republic Supply Company, Petroleum Bldg., Houston, Texas.
Rex Supply Company, Sour Lake, Texas.
Stanley Belting Corporation, 13-15 No. Jefferson St., Chicago, Ill.
Texas Rubber & Specialty Company, Houston, Texas.
Thermoid Rubber Company, Trenton, N. J.
Union Rubber & Asbestos Company, Trenton, N. J.
Union Supply Corp., Sulphur Mine, La.
U. S. Rubber Company, 1790 Broadway, New York, N. Y.
Worthington Pump & Machine Corporation, Harrison, N. Y.

PUMPING DERRICKS:

American Steel Derrick Company, Tulsa, Okla.
J. B. Beaird Corp., Shreveport, La.
The Continental Supply Company, 1501 Locust St., St. Louis, Mo.
Emsco Derrick & Equipment Company, 6811 S. Alameda St., Los Angeles, Calif.
Frick-Reid Supply Corp., Tulsa, Okla.
Hercules Supply Company, Ft. Worth, Texas.
The International Derrick & Equipment Company, Columbus, Ohio.
International Supply Company, Tulsa, Okla.
Kirk-Morrow Iron Works, Inc., Iola, Kansas.
Marion Machine, Foundry & Supply Company, Marion, Indiana.
Lee C. Moore and Company, Inc., Neville Island Branch, Pittsburgh, Pa.
Oil Well Supply Company, Dallas, Texas.
The Parkersburg Rig & Reel Company, Parkersburg, W. Va.
Steel Oil Derrick Company, Los Angeles, Calif.
Wertzberger Derrick Company, Box 61, Tulsa, Okla.

STANDARD RIGS:

The Continental Supply Company, 1501 Locust St., St. Louis, Mo.
Emsco Derrick & Equipment Company, 6811 S. Alameda Street, Los Angeles, Calif.
Franks Manufacturing Company, Box 1174, Tulsa, Okla.
Frick-Reid Supply Corp., Tulsa, Okla.
Hercules Supply Company, Ft. Worth, Texas.
The International Derrick & Equipment Company, Columbus, Ohio.
Marion Machine, Foundry & Supply Company, Marion, Indiana.
Lee C. Moore and Company, Inc., Neville Island Branch, Pittsburgh, Pa.
O'Brien Steel Construction Co., Inc., Washington, Penna.
Oil Well Supply Company, Dallas, Texas.
The Parkersburg Rig & Reel Company, Parkersburg, W. Va.
Rex Supply Company, Sour Lake, Texas.
Wertzberger Derrick Company, Box 61, Tulsa, Okla.

WALKING BEAMS:

American Steel Derrick Company, Tulsa, Okla.
Alten's Foundry & Machine Works, Lancaster, Ohio.
J. B. Beaird Corp., Shreveport, La.
The Cason Company, M. & M. Building, Houston, Texas.
The Continental Supply Company, 1501 Locust St., St. Louis, Mo.
Emsco Derrick & Equipment Company, 6811 S. Alameda Street, Los Angeles, Calif.
Franks Manufacturing Company, Box 1174, Tulsa, Okla.
Frick-Reid Supply Corp., Tulsa, Okla.
Hercules Supply Company, Ft. Worth, Texas.
The International Derrick & Equipment Company, Columbus, Ohio.
International Supply Company, Tulsa, Okla.
Kirk-Morrow Iron Works, Inc., Iola, Kansas.
Lufkin Foundry & Machine Company, Lufkin, Texas.
Marion Machine, Foundry & Supply Company, Marion, Indiana.
Lee C. Moore and Company, Inc., Neville Island Branch, Pittsburgh, Pa.
Moser Manufacturing Company, Kane, Penna.
O'Brien Steel Construction Co., Inc., Washington, Penna.
Oil Well Supply Company, Dallas, Texas.
The Parkersburg Rig & Reel Company, Parkersburg, W. Va.
Pelican Well Tool & Supply Company, Shreveport, La.
Rex Supply Company, Sour Lake, Texas.
Union Supply Corp., Sulphur Mine, La.

WALKING BEAM ACCESSORIES—

Pitmans, Stirrups, Polished Rods, Adjusters, etc.:
Alten's Foundry & Machine Works, Lancaster, Ohio.
Axelson Manufacturing Company, Los Angeles, Calif.
Baker Oil Tools, Inc., Box 609, Huntington Park, Calif.
Bridgeport Machine Company, Wichita, Kansas.
The Cason Company, M & M Building, Houston, Texas.
The Continental Supply Company, 1501 Locust St., St. Louis, Mo.
Emsco Derrick & Equipment Company, 6811 S. Alameda St., Los Angeles, Calif.
Franks Manufacturing Company, Box 1174, Tulsa, Okla.
Frick-Reid Supply Corp., Tulsa, Okla.
Hercules Supply Company, Fort Worth, Texas.
The International Derrick & Equipment Company, Columbus, Ohio.
International Supply Company, Tulsa, Okla.
Jarecki Manufacturing Company, 721 Olive St., St. Louis, Mo.
Lufkin Foundry & Machine Company, Lufkin, Texas.
Marion Machine, Foundry & Supply Company, Marion, Indiana.
Lee C. Moore and Company, Inc., Neville Island Branch, Pittsburgh, Pa.
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Oil Field Engineering Corporation, Fort Worth, Texas.
Oil Well Supply Company, Dallas, Texas.
The Parkersburg Rig & Reel Company, Parkersburg, W. Va.
Pelican Well Tool & Supply Company, Shreveport, La.
J. P. Ratigan, 1213 Santa Fe Ave., Los Angeles, Calif.
Republic Supply Company, Petroleum Bldg., Houston, Texas.
Rex Supply Company, Sour Lake, Texas.
Rotating Pumper Company, 1333 Santa Fe Ave., Los Angeles, Calif.
Union Supply Corp., Sulphur Mine, La.
Wertzberger Derrick Company, Box 61, Tulsa, Okla.

COUNTERBALANCES:

Allis-Chalmers Manufacturing Company, Milwaukee, Wis.
Alten's Foundry & Machine Works, Lancaster, Ohio.
Baker Oil Tools, Inc., Box 609, Huntington Park, Calif.

Bridgeport Machine Company, Wichita, Kansas.
The Cason Company, M & M Building, Houston, Texas.
The Continental Supply Company, 1501 Locust St., St. Louis.
Hercules Supply Company, Fort Worth, Texas.
The International Derrick & Equipment Company, Columbus, Ohio.
Lufkin Foundry & Machine Company, Lufkin, Texas.
Marion Machine, Foundry & Supply Company, Marion, Indiana.
Lee C. Moore and Company, Inc., Neville Island Branch, Pittsburgh, Pa.
W. C. Norris Manufacturer, Box 1188, Tulsa, Okla.
The OCS Manufacturing Company, Coffeyville, Kansas.
Oil Well Supply Company, Dallas, Texas.
The Parkersburg Rig & Reel Company, Parkersburg, W. Va.
Porter Sales Company, 216 Thompson Bldg., Tulsa, Okla.
Rex Supply Company, Sour Lake, Texas.
Rotating Pumper Company, 1333 Santa Fe Ave., Los Angeles, Calif.
Union Supply Corp., Sulphur Mine, La.

TUBING BLOCKS:

Alten's Foundry & Machine Works, Lancaster, Ohio.
Atlas Supply Company, Muskogee, Okla.
Bridgeport Machine Company, Wichita, Kansas.
The Continental Supply Company, 1501 Locust St., St. Louis, Mo.
Franks Manufacturing Company, Box 1174, Tulsa, Okla.
Frick-Reid Supply Corp., Tulsa, Okla.
Gulf Coast Machine & Supply Company, P. O. Box 999, Beaumont, Texas.
Hercules Supply Company, Fort Worth, Texas.
Houston Oilfield Material Co., Inc., 1816 Nance Street, Houston, Texas.
The International Derrick & Equipment Company, Columbus, Ohio.
International Supply Company, Tulsa, Okla.
Iverson Tool Company, Box 1227, Tulsa, Okla.
Lucey Products Corporation, 224 E. Brady, Tulsa, Okla.
Marion Machine, Foundry & Supply Company, Marion, Indiana.
The National Supply Companies, Toledo, Ohio.
Norvell-Wilder Supply Company, Beaumont, Texas.
Oil Center Tool Company, 924 Adele St., Houston, Texas.
Oil Well Supply Company, Dallas, Texas.
Pelican Well Tool & Supply Company, Shreveport, La.
Regan Forge & Engineering Company, Box 1058, San Pedro, Calif.
Republic Supply Company, Petroleum Bldg., Houston, Texas.
Rex Supply Company, Sour Lake, Texas.
Western Block Company, Lockport, N. Y.

TUBING CATCHERS:

Atlas Supply Company, Muskogee, Okla.
Bridgeport Machine Company, Wichita, Kansas.
Byron Jackson Company, Los Angeles, Calif.
The Continental Supply Company, 1501 Locust St., St. Louis, Mo.
The Dillon Company, 220-A East Brady Street, Tulsa, Okla.
Frick-Reid Supply Corp., Tulsa, Okla.
Guiberson Corp., P. O. Box 1106, Dallas, Texas.
Hercules Supply Company, Fort Worth, Texas.
Houston Oilfield Material Company, 1816 Nance Street, Houston, Texas.
The International Derrick & Equipment Company, Columbus, Ohio.
International Supply Company, Tulsa, Okla.
Jarecki Manufacturing Company, 721 Olive St., St. Louis, Mo.
Lucey Products Corporation, 224 E. Brady, Tulsa, Okla.
Marion Machine, Foundry & Supply Company, Marion, Indiana.
The National Supply Companies, Toledo, Ohio.
Norvell-Wilder Supply Company, Beaumont, Texas.
Oil Well Supply Company, Dallas, Texas.
J. P. Ratigan, 1213 Santa Fe Ave., Los Angeles, Calif.
Republic Supply Company, Petroleum Bldg., Houston, Texas.
Rex Supply Company, Sour Lake, Texas.
Smith Separator Corporation, P. O. Box 2003, Tulsa, Okla.
Union Supply Corp., Sulphur Mine, La.

TUBING ELEVATORS:

Atlas Supply Company, Muskogee, Okla.
The Bovaird Supply Company, Tulsa, Okla.
Bridgeport Machine Company, Wichita, Kansas.
Charles A. Butler Manufacturing Company, Okmulgee, Okla.
Byron Jackson Company, Los Angeles, Calif.
The Continental Supply Company, 1501 Locust St., St. Louis, Mo.
Frick-Reid Supply Company, Tulsa, Okla.
Guiberson Corp., Dallas, Texas.
Hercules Supply Company, Fort Worth, Texas.
Hinderliter Tool Company, Drawer 2650, Tulsa, Okla.
Houston Oilfield Material Co., 1816 Nance St., Houston, Texas.
The International Derrick & Equipment Company, Columbus, Ohio.
Lucey Products Corporation, 224 E. Brady, Tulsa, Okla.
Marion Machine, Foundry & Supply Company, Marion, Indiana.
The National Supply Companies, Toledo, Ohio.
Norris Bros., Inc., Robinson, Ill.
Norvell-Wilder Supply Company, Beaumont, Texas.
Oil Well Supply Company, Dallas, Texas.
J. P. Ratigan, 1213 Santa Fe Ave., Los Angeles, Calif.
Republic Supply Company, Petroleum Bldg., Houston, Texas.
Rex Supply Company, Sour Lake, Texas.
Union Supply Corp., Sulphur Mine, La.

TUBING HEADS:

Alten's Foundry & Machine Works, Lancaster, Ohio.
American Iron & Machine Works, Oklahoma City, Okla.
Atlas Supply Company, Muskogee, Okla.
Bridgeport Machine Company, Wichita, Kansas.
Cameron Iron Works, 711 Milby St., Houston, Texas.
The Continental Supply Company, 1501 Locust St., St. Louis, Mo.
Gray Tool Company, 6102 Harrisburg Blvd., Houston, Texas.
Gulf Coast Machine & Supply Company, P. O. Box 999, Beaumont, Texas.
Hercules Supply Company, Ft. Worth, Texas.
Hercules Tool Company, P. O. Box 286, Tulsa, Okla.
Hinderliter Tool Company, Drawer 2650, Tulsa, Okla.
Hughes Tool Company, Houston, Texas.
Iverson Tool Company, Box 1227, Tulsa, Okla.
Lucey Products Corporation, 224 E. Brady, Tulsa, Okla.
Marion Machine, Foundry & Supply Company, Marion, Indiana.
J. H. McEvoy & Company, 600 Milby Street, Houston, Texas.
The National Supply Companies, Toledo, Ohio.
W. C. Norris Manufacturer, Box 1188, Tulsa, Okla.
Oil Center Tool Company, 924 Adele Street, Houston, Texas.
The Oil Well Improvements Company, P. O. Box 699, Tulsa, Okla.
Oil Well Supply Company, Dallas, Texas.
Parkersburg Machine Company, Parkersburg, W. Va.
Pelican Well Tool & Supply Company, Shreveport, La.
Regan Forge & Engineering Company, Box 1058, San Pedro, Calif.
Republic Supply Company, Petroleum Bldg., Houston, Texas.
The Shaffer Specialty Company, Box 136, Whittier Station, Tulsa, Okla.
Shaffer Tool Works, 409 Velasco St., Houston, Texas.
Westcott Valve Company, East St. Louis, Ill.

SUCKER RODS:

Atlas Supply Company, Muskogee, Okla.
Axelson Manufacturing Company, Los Angeles, Calif.

Bridgeport Machine Company, Wichita, Kansas.
Buffalo Bolt Company, North Tonawanda, N. Y.
A. M. Byers Company, Pittsburgh, Penna.
The Continental Supply Company, 1501 Locust St., St. Louis, Mo.
Frick-Reid Supply Corp., Tulsa, Okla.
C. M. Heeter & Sons Company, Inc., Butler, Pa.
Hercules Supply Company, Ft. Worth, Texas.
Houston Oilfield Material Company, 1816 Nance St., Houston, Texas.
International Supply Company, Tulsa, Okla.
The S. M. Jones Company, Toledo, Ohio.
Lucey Products Corporation, 224 E. Brady, Tulsa, Okla.
Marion Machine, Foundry & Supply Company, Marion, Indiana.
The National Supply Companies, Toledo, Ohio.
Norris Bros., Inc., Robinson, Ill.
Norvell-Wilder Supply Company, Beaumont, Texas.
Oil Well Supply Company, Dallas, Texas.
Pelican Well Tool & Supply Company, Shreveport, La.
Reading Iron Company, 401 No. Broad Street, Philadelphia, Pa.
Republic Supply Company, Petroleum Bldg., Houston, Texas.
Rex Supply Company, Sour Lake, Texas.
Texas Steel Company, Ft. Worth, Texas.
Union Supply Corp., Sulphur Mine, La.

SUCKER ROD ACCESSORIES:

Alten's Foundry & Machine Works, Lancaster, Ohio.
Atlas Supply Company, Muskogee, Okla.
Axelson Manufacturing Company, Los Angeles, Calif.
Bradford Motor Works, Bradford, Pa.
Bridgeport Machine Company, Wichita, Kansas.
The Continental Supply Company, 1501 Locust St., St. Louis, Mo.
The Dillon Company, 220-A East Brady St., Tulsa, Okla.
Hercules Supply Company, Ft. Worth, Texas.
Hofco Pump, Ltd., 3001 Cherry Ave., Long Beach, Calif.
Jarecki Manufacturing Company, 721 Olive St., St. Louis, Mo.
The S. M. Jones Company, Toledo, Ohio.
Korner Engineering Company, 2026 Santa Fe Ave., Los Angeles, Calif.
Lucey Products Corporation, 224 E. Brady, Tulsa, Okla.
Marion Machine, Foundry & Supply Company, Marion, Indiana.
The National Supply Companies, Toledo, Ohio.
New York Rubber Corporation, 19 West 44th St., New York, N. Y.
Norris Bros., Inc., Robinson, Ill.
W. C. Norris Manufacturer, Box 1188, Tulsa, Okla.
Oil Well Supply Company, Dallas, Texas.
Pelican Well Tool & Supply Company, Shreveport, La.
Petroleum Equipment Company, Fort Worth, Texas.
J. P. Ratigan, 1213 Santa Fe Ave., Los Angeles, Calif.
Republic Supply Company, Petroleum Bldg., Houston, Texas.
Rex Oil Tool Manufacturing Company, P. O. Box 48, Butler Road, Santa Fe Springs, Calif.
Rex Supply Company, Sour Lake, Texas.
Sargent Engineering Corporation, P. O. Box 95, Huntington Park, Calif.
The Shaffer Specialty Company, Box 136, Whittier Station, Tulsa, Okla.
Union Supply Corp., Sulphur Mine, La.

SUCKER ROD TOOLS — Hooks, Wrenches, Bits, Cleaners, Elevators, Etc.:

Atlas Supply Company, Muskogee, Okla.
Bradford Motor Works, Bradford, Pa.
Bridgeport Machine Company, Wichita, Kansas.
Byron Jackson Company, Los Angeles, Calif.
The Continental Supply Company, 1501 Locust St., St. Louis, Mo.
Hercules Supply Company, Ft. Worth, Texas.
Hinderliter Tool Company, Drawer 2650, Tulsa, Okla.
Hofco Pump, Ltd., 3001 Cherry Ave., Long Beach, Calif.
The S. M. Jones Company, Toledo, Ohio.
Lucey Products Corporation, 224 E. Brady, Tulsa, Okla.
Marion Machine, Foundry & Supply Company, Marion, Indiana.
The National Supply Companies, Toledo, Ohio.
Norris Bros., Inc., Robinson, Ill.
W. C. Norris Manufacturer, Box 1188, Tulsa, Okla.
Norvell-Wilder Supply Company, Beaumont, Texas.
Oil Well Supply Company, Dallas, Texas.
Pelican Well Tool & Supply Company, Shreveport, La.
J. P. Ratigan, 1213 Santa Fe Ave., Los Angeles, Calif.
Regan Forge & Engineering Company, Box 1058, San Pedro, Calif.
Republic Supply Company, Petroleum Bldg., Houston, Texas.
Rex Supply Company, Sour Lake, Texas.
The Shaffer Specialty Company, Box 136, Whittier Station, Tulsa, Okla.
Union Supply Corp., Sulphur Mine, La.

WORKING BARRELS:

Atlas Supply Company, Muskogee, Okla.
Axelson Manufacturing Company, Los Angeles, Calif.
Bradford Motor Works, Bradford, Pa.
Bridgeport Machine Company, Wichita, Kansas.
The Continental Supply Company, 1501 Locust St., St. Louis, Mo.
Economy Pump Company, 105 S. Wheeling Street, Tulsa, Okla.
Fluid Packed Pump Company, Box 4333, Oklahoma City, Okla.
Franklin Valveless Engine Company, Franklin, Pa.
Frick-Reid Supply Corp., Tulsa, Okla.
Gray Tool Company, 6102 Harrisburg Blvd., Houston, Texas.
Hercules Supply Company, Ft. Worth, Texas.
Hofco Pump, Ltd., 3001 Cherry Ave., Long Beach, Calif.
The Charles N. Hough Manufacturing Company, Box 151, Franklin, Penna.
Iverson Tool Company, Box 1227, Tulsa, Okla.
Larkin Packer Company, St. Louis, Mo.
Lucey Products Corporation, 224 E. Brady, Tulsa, Okla.
Marion Machine, Foundry & Supply Company, Marion, Indiana.
McGregor Working Barrel Company, Bradford, Penna.
The National Supply Companies, Toledo, Ohio.
Norris Bros., Inc., Robinson, Ill.
W. C. Norris Manufacturer, Box 1188, Tulsa, Okla.
Northrup Equipment Company, Parkersburg, W. Va.
Norvell-Wilder Supply Company, Beaumont, Texas.
Oil Well Supply Company, Dallas, Texas.
Pacific Pump Works, 5716 Bicket Street, Huntington Park, Calif.
Pelican Well Tool & Supply Co., Shreveport, La.
Petroleum Equipment Company, Fort Worth, Texas.
Republic Supply Company, Petroleum Bldg., Houston, Texas.
Rex Supply Company, Sour Lake, Texas.
Sargent Engineering Corporation, P. O. Box 95, Huntington Park, Calif.
The Shaffer Specialty Company, Box 136, Whittier Station, Tulsa, Okla.
Triangle Pump Company, 3204 Cherry Ave., Long Beach, Calif.
Union Supply Corp., Sulphur Mine, La.
W.K.M. Company, Inc., Houston, Texas.

SAND PUMPS:

Martin-Decker Corporation, Box 249, Long Beach, Calif.
Miller Sand Pump Company, Box 1111, Sapulpa, Okla.

DYNAMOMETERS:

Martin-Decker Corp., Long Beach, Calif.

PUMPS, PUMP ACCESSORIES— Valves, Balls and Seats, Etc.:

The Abbott Ball Company, Hartford, Conn.
Alford Sales & Service, Ltd., Long Beach, Calif.

PUMPING EQUIPMENT BUYERS' GUIDE

Atlas Supply Company, Muskogee, Okla.
Axelson Manufacturing Company, Los Angeles, Calif.
Bradford Motor Works, Bradford, Pa.
Bridgeport Machine Company, Wichita, Kansas.
The Continental Supply Company, 1501 Locust St., St. Louis, Mo.
Darling Valve & Manufacturing Company, Williamsport, Penna.
Economy Pump Company, 105 S. Wheeling Street, Tulsa, Okla.
Fluid Packed Pump Company, Box 4333, Oklahoma City, Okla.
Gardner-Denver Company, Quincy, Ill.
Happy Belting Company, Tulsa, Okla.
Hercules Supply Company, Ft. Worth, Texas.
Hofco Pump, Ltd., 3001 Cherry Ave., Long Beach, Calif.
The Charles N. Hough Manufacturing Company, Box 151, Franklin, Penna.
Houston Oilfield Material Company, 1816 Nance Street, Houston, Texas.
Lucey Products Corporation, 224 E. Brady, Tulsa, Okla.
Manheim Manufacturing & Belting Company, Manheim, Penna.
Marion Machine, Foundry & Supply Company, Marion, Indiana.
The National Supply Companies, Toledo, Ohio.
National Transit Pump & Machine Company, Oil City, Penna.
New York Rubber Corporation, 19 West 44th St., New York, N. Y.
Norris Bros., Inc., Robinson, Ill.
W. C. Norris Manufacturer, Box 1188, Tulsa, Okla.
Northrup Equipment Company, Parkersburg, W. Va.
Norvell-Wilder Supply Company, Beaumont, Texas.
Oil Well Supply Company, Dallas, Texas.
Pacific Pump Works, 5716 Bicket Street, Huntington Park, Calif.
Pelican Well Tool & Supply Co., Shreveport, La.
Petroleum Equipment Company, Fort Worth, Texas.
Quaker City Rubber Company, Philadelphia, Pa.
Republic Supply Company, Petroleum Bldg., Houston, Texas.
Rex Supply Company, Sour Lake, Texas.
Sargent Engineering Corporation, P. O. Box 95, Huntington Park, Calif.
The Titusville Iron Works Company, Titusville, Penna.
Triangle Pump Company, 3204 Cherry Ave., Long Beach, Calif.
Union Supply Corporation, Sulphur Mine, Louisiana.
Wheatley Bros., Tulsa, Okla.

CUPS:

Atlas Supply Company, Muskogee, Okla.
C. L. & W. W. Auer, Corry, Penna.
Bradford Motor Works, Bradford, Pa.
Bridgeport Machine Company, Wichita, Kansas.
Chicago Belting Company, 125 North Green St., Chicago, Ill.
The Continental Supply Company, 1501 Locust St., St. Louis, Mo.
Darling Valve & Manufacturing Company, Williamsport, Penna.
Diamond Rubber Company, Akron, Ohio.
The Dragon Manufacturing Company, Marietta, Ohio.
Economy Pump Company, 105 S. Wheeling St., Tulsa, Okla.
Happy Belting Company, Tulsa, Okla.
Hercules Supply Company, Fort Worth, Texas.
Hinderliter Tool Company, Drawer 2650, Tulsa, Okla.
Hofco Pump, Ltd., 3001 Cherry Ave., Long Beach, Calif.
Lucey Products Corporation, 224 E. Brady, Tulsa, Okla.
Marion Machine, Foundry & Supply Company, Marion, Indiana.
The National Supply Companies, Toledo, Ohio.
Norris Bros., Inc., Robinson, Ill.
Northrup Equipment Company, Parkersburg, W. Va.
Norvell-Wilder Supply Company, Beaumont, Texas.
Oil Well Supply Company, Dallas, Texas.
Pelican Well Tool & Supply Co., Shreveport, La.
Horace G. Preston Company, 238 Fourth Ave., Pittsburgh, Pa.
Republic Supply Company, Petroleum Bldg., Houston, Texas.
Rex Supply Company, Sour Lake, Texas.
Sargent Engineering Corporation, P. O. Box 95, Huntington Park, Calif.
The J. E. Scott Cup Company, 519 W. Goodale Street, Columbus, Ohio.
Triad Products Company, Inc., Shuey Building, Springfield, Ohio.
Union Supply Corp., Sulphur Mine, La.
Wise Machine Company, Butler, Pa.

PULLING MACHINES AND CLEAN OUT EQUIPMENT:

Allis-Chalmers Manufacturing Company, Milwaukee, Wis.
Allsteel Products Manufacturing Company, Wichita, Kansas.
Atlas Supply Company, Muskogee, Okla.
J. B. Beaird Corp., Shreveport, La.
Brewster Company, Inc., Shreveport, La.
The Continental Supply Company, 1501 Locust St., St. Louis, Mo.
Fred E. Cooper, 211 South Lansing Ave., Tulsa, Okla.
Franks Manufacturing Company, Box 1174, Tulsa, Okla.
Frick-Reid Supply Corp., Tulsa, Okla.
Hercules Supply Company, Fort Worth, Texas.
The International Derrick & Equipment Company, Columbus, Ohio.
Lufkin Foundry & Machine Company, Lufkin, Texas.
Marion Machine, Foundry & Supply Company, Marion, Indiana.
Mead-Morrison Manufacturing Company, Boston, Mass.
Lee C. Moore and Company, Inc., Neville Island Branch, Pittsburgh, Pa.
Muskogee Iron Works, Muskogee, Okla.
The National Supply Companies, Toledo, Ohio.
Oil Well Supply Company, Dallas, Texas.
Rotating Pumper Company, 1333 Santa Fe Ave., Los Angeles, Calif.
The Shaffer Specialty Company, Box 136, Whittier Station, Tulsa, Okla.
W-K-M Company, Inc., Houston, Texas.
Wichtex Machinery Company, Inc., Box 221, Wichita Falls, Texas.
Wilson Manufacturing Company, Wichita Falls, Texas.
Wise Machine Company, Butler, Pa.
Young Engine Corporation, P. O. Box 532, Canton, Ohio.

PACKERS:

American Iron & Machine Works Company, Oklahoma City, Okla.
Baash-Ross Tool Company, Los Angeles, Calif.
Frick-Reid Supply Corp., Tulsa, Okla.
The Garlock Packing Company, Palmyra, N. Y.
Guiberson Corp., Dallas, Texas.
The Gustin Bacon Manufacturing Company, 1412 W. 12th St., Kansas City, Mo.
C. M. Heeter & Sons Company, Inc., P. O. Box 898, Butler, Penna.
Houston Oilfield Material Company, 1816 Nance St., Houston, Texas.
International Supply Company, Tulsa, Okla.
The Lane-Wells Company, 4439 Santa Fe Ave., Los Angeles, Calif.
Larkin Packer Company, St. Louis, Mo.
National Supply Companies, Toledo, Ohio.
Norvell-Wilder Supply Company, Beaumont, Texas.
Parkersburg Machine Company, Parkersburg, W. Va.
Quaker City Rubber Company, Philadelphia, Pa.
Republic Rubber Company, Youngstown, Ohio.
Republic Supply Company, Petroleum Bldg., Houston, Texas.
Robinson Packer Company, Tulsa, Okla.
Spang & Company, Box 689, Butler, Pa.
Texas Iron Works, Inc., Houston, Texas.
Texas Rubber & Specialty Corp., Houston, Texas.
Union Supply Corp., Sulphur Mine, La.
U. S. Rubber Company, 1790 Broadway, New York, N. Y.
Wheatley Bros., Tulsa, Okla.

MARKETS — STATISTICS

Federal control of "hot" oil reverses weak tendency of crude prices, but Mid-Continent gasoline unsettled.

Crude Prices Show Firmness Following Order by President

THE irregularity and tendency toward weakness into which the crude oil market had begun slipping gave way during the past week to relative firmness after announcement July 12 of the new federal government ban against interstate and foreign shipment of "hot" oil to curb excessive production.

Despite the brighter outlook, however, purchasers continued at variance late in the week in their opinions on how much prices should be raised above the levels prevailing prior to the opening of July. Substantially higher quotations had been placed in effect, by then, nevertheless, in most areas of the United States outside of California.

It was before the federal announcement about "hot" oil shipments that a compromise move on crude prices got under way in the Mid-Continent, with purchasers coming into closer agreement on their quotations.

Continental Oil Company and Barnsdall Oil Company led in the compromise move July 10 by abandoning the 85-cent top price for Oklahoma-Kansas-North Texas crudes which the former company had initiated July 6, and by adopting instead the Magnolia Petroleum Company schedule of July 7, providing a top price of 75 cents for oil of 40 gravity and higher.

Magnolia Petroleum Company's schedule for Oklahoma-North Texas, and North Central Texas is as follows:

Below 25 gravity	$ .43
25-25.9 gravity	.45
26-26.9 gravity	.47
27-27.9 gravity	.49
28-28.9 gravity	.51
29-29.9 gravity	.53
2-cent spread to 40 gravity and above	.75

Concerns which followed Continental Oil Company and Barnsdall Oil Company in adopting the Magnolia schedule included: Empire Oil & Refining Company, Pure Oil Company, White Eagle Oil Corporation, Sinclair Prairie Oil Marketing Company, Kanotex Refining Company, and others.

While the above readjustments were being made another group of purchasers continued holding to the 62-cent top price for Mid-Continent crudes initiated by Carter Oil Company July 6, and this group incidentally gained additional following.

THE OIL WEEKLY

Estimated Average Daily Production of Crude Oil, in Barrels

District or State	Week Ending July 15	Week Ending July 8
TEXAS—		
Texas Panhandle	49,100	49,600
North and West Central Texas	66,550	65,000
West Texas	163,000	159,575
East Central Texas	58,500	58,500
East Texas Field	*550,000	*550,000
South Texas	47,500	47,750
Total Texas outside Gulf Coast	934,650	930,425
Texas Gulf Coast	180,950	181,925
Total Texas	1,115,600	1,112,350
OKLAHOMA—		
Oklahoma City	264,305	253,940
Seminole Area	141,450	137,650
Others	181,710	181,760
Total Oklahoma	587,465	573,350
KANSAS—		
Ritz-Decker	25,585	24,480
Voshell	6,870	6,750
Nikkel-Hollow	25,210	.....
Others	74,735	99,820
Total Kansas	132,400	131,050
LOUISIANA—		
North Louisiana	25,750	24,550
Louisiana Gulf Coast	41,400	41,450
Total Louisiana	67,150	66,000
ARKANSAS	30,975	29,525
CALIFORNIA—		
Long Beach	73,000	75,000
Santa Fe Springs	53,800	54,500
Huntington Beach	34,000	30,000
Dominguez	20,500	20,000
Inglewood	12,000	12,000
Ventura Avenue	33,300	33,300
Seal Beach	11,800	11,700
Midway Sunset	47,300	47,000
Elwood	14,500	13,800
Kettleman Hills	63,000	66,000
Playa del Rey	11,300	11,400
Others	112,500	109,300
Total California	487,000	484,000
MOUNTAIN STATES—		
Wyoming	26,550	30,050
Montana	7,750	7,700
Colorado	2,550	2,350
New Mexico	37,400	35,950
Total Rocky Mountain States	74,250	76,050
EASTERN STATES	86,600	94,950
MICHIGAN	16,500	16,650
Total United States reported production	2,597,940	2,583,925
*Unreported East Texas output, estimated	200,000	150,000
Total United States actual production, including estimated East Texas excess	2,797,940	2,733,925

The Carter Oil Company schedule provides the following range of prices:

Below 25 gravity	$ .30
25-25.9 gravity	.32
26-26.9 gravity	.34
27-27.9 gravity	.36
28-28.9 gravity	.38
29-29.9 gravity	.40
2-cent spread to 40 gravity and above	.62

Among the more recent to adopt the 62-cent top price were Gypsy Oil Company in Oklahoma and Kansas and Gulf Pipe Line Company in North Texas. That posting had previously gained the favor of various purchasers, including Shell Petroleum Corporation, Rock Island Refining Company, Wirt Franklin Petroleum Corporation, Stanolind Crude Oil Purchasing Company, The Texas Company in Oklahoma and Kansas, Bell Oil & Gas Company, Sunray Oil Company, Johnson Oil Refining Company, Midcontinent Petroleum Corporation, Deep Rock Oil Corporation.

Mid-Western States

In line with the compromise of Continental Oil Company and others involving cancellation of 10 cents of a previous 33-cent increase in the Mid-Continent, a similar downward readjustment was made in the Mid-West by Ohio Oil Company effective July 12. Putting into effect a 10-cent reduction, the company posted new prices as follows: Lima 95 cents a barrel, Illinois and Princeton 90 cents, and Western Kentucky 85 cents. As of July 14 Ohio Oil Company discontinued posting a market price on Indiana crude, and it had previously discontinued posting on Wooster crude.

Rocky Mountain States

Higher prices spread into the Rocky Mountain states July 8, when The Ohio Oil Company increased Rock Creek from 52 to 54 cents and placed into effect 10-cent increases for other fields, quoting new prices as follows: Elk Basin and Grass Creek light 72 cents a barrel, Big Muddy 55 cents, and Sunburst 90 cents.

Eastern States

Increases of 10 to 13 cents a barrel had been made in Eastern States prices July 7. Joseph Seep Purchasing Agency of the South Penn Oil Company announced prices as follows: on Pennsylvania grade oil in South West Pipe Line $1.37, up 10 cents; same grade oil in Eureka Pipe Line Company $1.32, up 10 cents; and same grade in Buckeye Pipe Line Company

$1.17, up 10 cents; Corning grade in Buckeye Pipe Line Company 80 cents, up 10 cents. Tide Water Pipe Line Company, Ltd., quotations were: Pennsylvania grade oil in New York Transit Company system and Bradford district oil in National Transit Company, $1.70 per barrel, an increase of 13 cents.

East Texas

No further support was forthcoming during the past week for the 75-cent flat price posted by four companies for East Texas field crude, other purchasers holding to the old 50-cent price. The four companies paying the higher price included: Sinclair-Prairie Oil Marketing Company, Empire Gas & Fuel Company, Sun Oil Company, and Magnolia Petroleum Company.

Likewise Magnolia Petroleum Company failed to gain a following for its higher postings in West and Southwest Texas.

Production High Although Hope of Decline Held

THE oil industry was encouraged during the past week by the prospect of a decline in crude oil output in the near future in consequence of the proposed federal government ban on interstate and foreign shipment of "hot" oil. But while the future gave such promise, the existing production situation was not comforting, the nation's crude oil output continuing far above consumption requirements.

United States production on which reports were available indicated that during the week ending July 15 output averaged 2,597,940 barrels daily, or 14,015 barrels more per day than in the previous week.

Thus the country was still producing about 200,000 barrels per day more than it was consuming, accepting the estimate of the American Petroleum Institute's committee on refinery statistics and economics that the demand for United States crude oil will average 2,382,000 barrels daily for the six months ending September 30.

The above figures, moreover, do not take into consideration large quantities of unreported production in East Texas in the form of output above the official allowables, proration-exempt shallow production, and oil produced in the making of "potential" tests of wells. Latest reliable estimates indicate that actual production has been running around 200,000 barrels per day in excess of the field's allowable, which is now 574,000 barrels daily, having been gradually increasing through completion of additional wells.

The recent strengthening of the East Texas crude oil market, involving payment of 75 cents per barrel by four purchasers and 50 cents by others, has had a stimulating effect on traffic in illegal oil, assuring proration violators relatively good prices even though such prices continued well below official postings. Definite information is not available, of course, on such transactions, but it is reported that crude produced in excess of proration quotas has been bringing prices of 30 to 45 cents per barrel.

In contrast with the encouragement offered proration violators by the favorable market prices, discouragement was generated in no uncertain degree during the past week by the movement launched by the federal government with the objective of stopping interstate and foreign shipment of crude and refined oils produced in violation of state or federal laws or regulations. For a very high proportion of "hot" oil, particularly in East Texas, can find markets only through interstate shipments, involving movement by railroad tank car and coastwise shipping.

The meager information available late in the past week on shipments out of the market-dominating East Texas area indicated a very sharp drop in tank car movements of oil following announcement of the federal government's plan.

The announcement was also followed by a strengthening of the wholesale gasoline market in the East Texas area, buyers bidding the price up to 3⅝ cents per gallon as against quotations less than 3½ cents a few days earlier.

East Texas Gasoline Causes Weakness in Mid-Continent

CONFUSION in crude oil prices with four different schedules operative in Oklahoma combined with a greatly increased offering of East Texas low octane motor fuel at concession prices produced an unsettled condition in the Mid-Continent market during the week. In the hope that a compromise might be made in the crude situation Continental Oil Company reduced its posting July 11 to a top price of 75 cents and a low of 51 cents for gravities below 29 degrees. It was expected momentarily that other major purchasers, which has increased only 10 cents per barrel, would meet the new top of 75 cents. However, as the week end approached no further announcements had been made by Carter Oil Company and Stanolind Crude Oil Purchasing Company, largest purchasers in Oklahoma. On July 13, Gypsy Oil Company announced that effective that date it would pay 62 cents for gravities of 40 and above with a two-cent differential, making below 29 degrees 38 cents. This met the Carter and Stanolind schedules.

Undoubtedly some general move will be made within the next few days to clarify the price situation. It was being predicted that failure on the part of purchasers to make such a move would result in federal intervention within short time especially in view of the price trend in refined materials.

Estimated net crude oil movement in Kansas and Oklahoma during the week ending July 3, was 24,000 barrels daily to storage compared to a net of 59,500 barrels daily during the preceding week. According to the best information available, movement of East Texas crude into Oklahoma has been greatly reduced during the past month. During

Crude Runs to Stills, Motor Fuel Stocks, Gas and Fuel Oil Stocks and Cracked Gasoline Production, Week Ended July 8, 1933

(Figures in barrels of 42 gallons each)

DISTRICT	Daily Refining Capacity of Plants			Crude Runs to Stills		MOTOR FUEL STOCKS				Gas and Fuel Oil Stocks	Daily Charging Capacity of Cracking Units			Cracked Production Daily Average
	Potential Rate	Reporting		Daily Average	% Operated	At Refineries	Bulk Term., in Transit & Pipe Lines	(a) Other M. F. Stocks	Total Motor Fuel		Potential Rate	Reporting		
		Total	%									Total	%	
East Coast	582,000	582,000	100.0	439,000	75.4	5,406,000	9,726,000	52,000	15,184,000	7,329,000	496,500	471,500	95.0	78,000
Appalachian	150,800	139,700	92.6	86,000	61.6	1,232,000	602,000	173,000	2,007,000	965,000	67,800	67,800	100.0	24,000
Ind., Ill., Ky	436,600	425,000	97.3	351,000	82.6	4,477,000	2,739,000	55,000	7,271,000	4,322,000	325,300	308,000	94.7	109,000
Okla., Kans., Mo	454,600	372,000	81.8	253,000	68.0	2,424,000	1,514,000	310,000	4,248,000	3,637,000	255,800	234,000	91.5	55,000
Inland Texas	271,800	158,500	58.3	86,000	54.3	923,000	127,000	213,000	1,263,000	2,054,000	77,400	61,200	79.1	23,000
Texas Gulf	507,500	497,500	98.0	438,000	88.0	5,828,000	173,000	189,000	6,190,000	6,635,000	358,400	348,900	97.3	95,000
Louisiana Gulf	162,000	162,000	100.0	144,000	88.9	1,056,000	139,000	.....	1,195,000	2,023,000	70,600	70,600	100.0	20,000
North La.,—Ark.	82,600	76,500	92.6	40,000	52.3	173,000	57,000	35,000	265,000	504,000	41,500	38,500	92.8	7,000
Rocky Mountain	80,700	63,600	78.8	40,000	62.9	1,037,000	.....	27,000	1,046,000	731,000	45,800	42,500	92.8	9,000
California	848,200	821,800	96.9	468,000	56.9	6,494,000	4,521,000	2,466,000	13,481,000	98,824,000	208,600	208,600	100.0	57,000
TOTALS WEEK: July 8, 1933	3,576,800	3,298,600	92.2	2,345,000	71.1	29,050,000	19,598,000	3,520,000	52,168,000	127,024,000	1,947,700	1,851,600	95.1	477,000
July 1, 1933	3,576,800	3,298,600	92.2	2,345,000	71.1	29,103,000	19,866,000	3,465,000	52,434,000	126,500,000	1,947,700	1,851,600	95.1	452,000

Below are set out estimates of Crude Runs and Motor Fuel Stocks on B. of M. Basis for Week July 8, 1933, compared with certain July 1932 Bureau figures.

Estimate B. of M. Basis Week July 8, 1933	2,495,000	(b)	30,050,000	20,600,000	3,520,000	54,170,000		540,000
U. S. B. of M. July 1932 Figures:—		7/1	34,400,000	23,261,000	3,897,000	61,558,000		
July 1932 Daily Average Crude Runs	2,305,000	7/31	34,349,000	23,937,000	3,895,000	62,181,000	July 1932 Daily Average Cracked Prod.	491,000

(a) Estimated. Includes unblended natural gasoline at refineries and plants, also blended motor fuel at plants.

(b) Estimated to permit comparison with A. P. I. Economics Report which is on Bureau of Mines basis.

a portion of June reports indicated that a daily average of more than 100,000 barrels of East Texas crude were moving daily into Oklahoma. As of the week ending July 3 this figure seems to have been reduced to approximately 42,000 barrels daily.

Ruling prices based on Group 3, Oklahoma, and exclusive of federal tax, appeared to be as follows:

Refinery Gasolines

Low octane, US motor fuel, 3¾ to 4 cents; middle octane, 4⅜ to 4¾ cents; high octane, 4¾ to 4⅞ cents; 60-62, 400 e.p., 4 to 4¼ cents; 64-66, 390 e.p., 4⅛ to 4¼ cents; 64-66, 375 e.p., 4¼ to 4⅜ cents; and 68-70, 350 e.p., 4⅜ to 4⅝ cents.

Natural Gasolines

The 14 to 15 pound vapor pressure grades, 3¾ to 4 cents; 16 to 18 pounds vapor, 3½ to 3¾ cents; 22 to 24 pound vapor, 3½ to 3¾ cents; and 26-70 grade, 2¾ to 3 cents.

Kerosene

The 41 to 43 gravity, water white, 2½ to 2⅝ cents; 42 to 44 gravity, 2⅝ to 2¾ cents; and 44 to 46 gravity, 4 to 4¼ cents.

Summarized Review of Field Results

State	Completions	Oil wells	Gas wells	Failures	Init. prod.
Arkansas	1	0	0	1	0
California	6	5	0	1	11,100
Illinois	1	0	0	1	0
Indiana	1	0	1	0	0
Kansas	8	6	0	2	4,488
Kentucky	5	3	0	2	28
Louisiana	15	4	1	10	2,467
Michigan	7	5	0	2	2,195
Mississippi	0	0	0	0	0
New Mexico	0	0	0	0	0
New York	0	0	0	0	0
Ohio	17	4	11	2	37
Oklahoma	15	8	0	7	3,046
Pennsylvania	1	1	0	0	15
Texas	105	71	4	30	168,567
West Virginia	6	1	2	3	15
Totals	188	108	19	61	191,958

Imports for Week Well Above Four-Week Average

IMPORTS of crude and refined petroleum at principal United States ports during the week ending July 8 totaled 1,045,000 barrels, a daily average of 149,286 barrels, compared with 109,714 barrels daily the previous week and 102,786 barrels daily the four weeks ended July 8. These figures are as reported by the American Petroleum Institute.

The 1,045,000 barrels included 76,000 barrels received at Boston, 628,000 barrels at New York, and 275,000 barrels at Philadelphia, and consisted of 692,000 barrels of crude oil and 353,000 barrels fuel oil.

Receipts of California oil, crude and refined, at Atlantic and Gulf Coast ports for the week ended July 8 totaled 736,000 barrels, a daily average of 105,143 barrels, compared with 11,571 barrels daily the previous week and 42,964 barrels daily for the four weeks ended July 8.

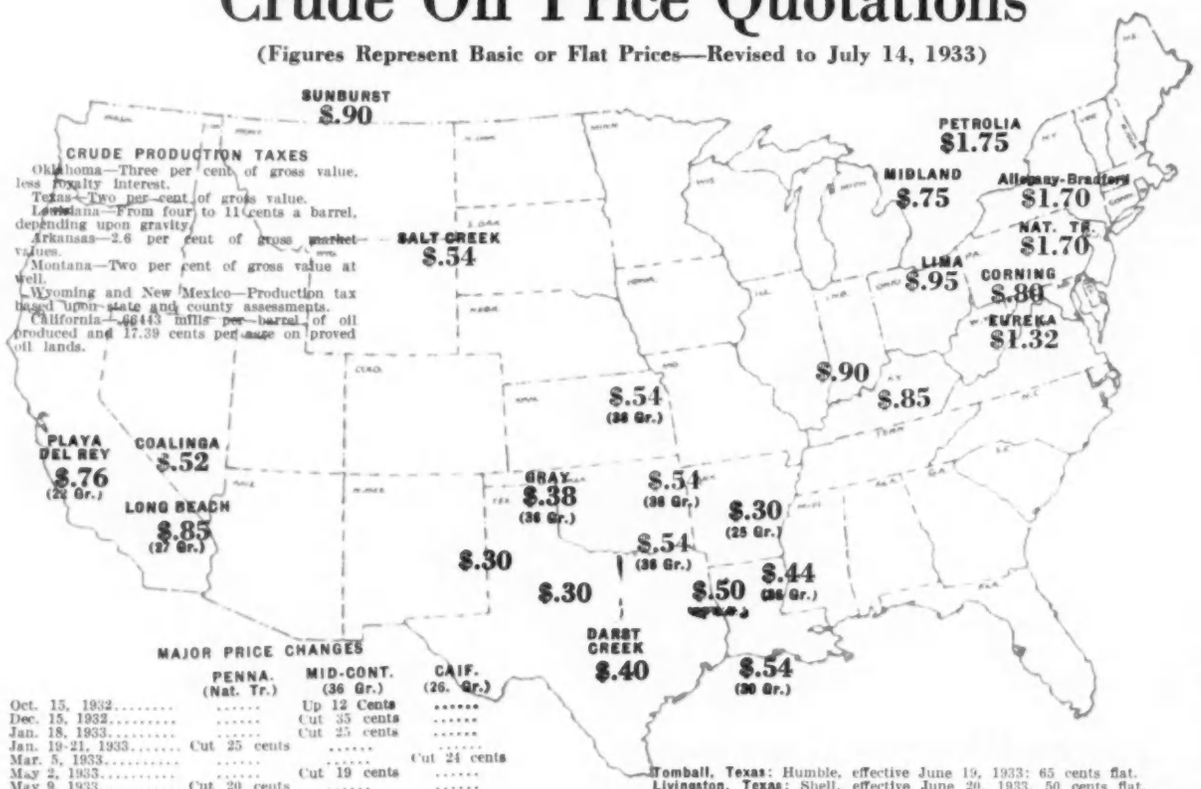
The 736,000 barrels included 73,000 barrels received at Baltimore, 344,000 barrels at Philadelphia, and 258,000 barrels at other Atlantic Coast ports, and 61,000 barrels of fuel oil received at Key West on the Gulf Coast. The Atlantic Coast shipments included 595,000 barrels gasoline and 80,000 barrels of kerosene.

Comparison of Permits Granted For New Wells

State	For week ending July 8	Total this month	Total this year	Total this date last year	1932 year total
Arkansas	0	0	28	9	33
California	65	120	298	171	354
Louisiana	42	57	345	264	451
Kansas	20	27	275	337	463
Michigan	12	25	153	81	183
Oklahoma	30	48	519	598	1054
Texas	157	345	3101	4902	7099
Total	326	622	4719	6362	9637

Crude Oil Price Quotations

(Figures Represent Basic or Flat Prices—Revised to July 14, 1933)



MAJOR PRICE CHANGES

	PENNA. (Nat. Tr.)	MID-CONT. (36 Gr.)	CAIF. (26 Gr.)
Oct. 15, 1932	.....	Up 12 Cents	.....
Dec. 15, 1932	.....	Cut 35 cents	.....
Jan. 18, 1933	.....	Cut 25 cents	.....
Jan. 19-21, 1933	Cut 25 cents	.....	.....
Mar. 5, 1933	.....	.....	Cut 24 cents
May 2, 1933	.....	Cut 19 cents	.....
May 9, 1933	Cut 20 cents	.....	.....
May 22, 1933	Up 10 cents	.....	.....
June 19, 1933	Up 10 cents	Up 19 cents	.....
June 26, 1933	Up 10 cents	.....	Up 9-12 cents
July 6, 1933	Up 13 cents	Up 10 cents	.....

Oklahoma and Kansas: Magnolia, and others, effective July 7-12, 1933, below 25 gravity 43 cents, 25-25.9 gravity 45 cents, 2-cent spread to 40 gravity and above 75 cents. Carter and others, July 6-8, 1933, below 25 gravity 30 cents, 25-25.9 gravity 32 cents, 2-cent spread to 62 cents for 40 and above.

North and North Central Texas: Humble, and others, effective June 17-19, 1933: below 29 gravity 28 cents, 29-29.9 gravity 30 cents, 2-cent spread to 52 cents for 40 gravity and above. Magnolia and others, July 7-12, 1933: below 25 gravity 43 cents, 25-25.9 gravity 45 cents, 2-cent spread to 75 cents for 40 gravity and above. Gulf and others, July 13, 1933, below 29 gravity 38 cents, 29-29.9 gravity 40 cents, 2-cent spread to 62 cents for 40 and above.

Van, Texas: Pure-Van, July 11, 1933, below 29 gravity 51 cents, 2-cent spread to 75 cents for 40 gravity and above.

East Texas Field: Sinclair, Empire, Sun, Magnolia, effective July 6-7, 1933, 75 cents. Others effective June 17-19, 1933: 50 cents.

Corsicana, Texas, Heavy: Magnolia, effective June 17, 1933: 30 cents.

Texas Panhandle, Gray County: Humble and others, June 19-22, 1933, below 35 gravity 34 cents, 35-35.9 gravity 36 cents and 2-cent differential to 46 cents for 40 gravity and above. Magnolia, effective July 7, 1933, below 35 gravity 57 cents, 35-35.9 gravity 59 cents, 2-cent differential to 40 gravity and above 69 cents. Philtex Oil Co., July 12, 1933, below 29 gravity 41 cents, 29-29.9 gravity 43 cents, 2-cent spread to 65 cents for 40 and above.

Carson and Hutchinson Counties: Humble and others, June 19-22, 1933, below 35 gravity 29 cents, 35-35.9 gravity 31 cents, and 2-cent differential to 41 cents for 40 gravity and above. Magnolia, July 7, 1933, below 35 gravity 47 cents, 35-35.9 gravity 49 cents, 2-cent spread to 40 gravity and above 59 cents. Philtex Oil Co., July 12, 1933, below 29 gravity 31 cents, 29-29.9 gravity 33 cents, 2-cent spread to 55 cents for 40 gravity and above.

West Texas and New Mexico: Includes crude from Crane-Upton, Crockett, Ector, Howard-Glasscock, Mitchell, Pecos, Jones, Fisher and Winkler Counties, Texas, and Lea County, New Mexico. Magnolia, effective July 7, 1933, 45 cents. Others, effective June 19, 1933, 30 cents.

Yates Shallow: Shell, June 20, 1933, 25 cents.

Texas-Louisiana Gulf Coast fields: Effective June 17-19, 1933: below 28 gravity 32 cents, 20-20.9 gravity 34 cents, and 2-cent differential to 62 cents for 34 gravity and above. Exception listed below.

Conroe, Texas: Humble, effective June 19, 1933, and Texas and Tide Water June 22, 1933: 35-35.9 gravity 59 cents and 2-cent differential to 69 cents for 40 gravity and above.

Tomball, Texas: Humble, effective June 19, 1933: 65 cents flat.

Livingston, Texas: Shell, effective June 20, 1933, 50 cents flat.

Iowa and Cameron Meadows, Louisiana: Magnolia, effective June 20, 1933: below 20 gravity 22 cents, 20-20.9 gravity 24 cents and 2-cent differential to 52 cents for 34 gravity and above.

Darst Creek: Magnolia, July 7, 1933, 55 cents. Others June 9, 1933, 40 cents. **Luling:** Magnolia, effective July 7, 1933, 50 cents. **Salt Flat:** effective June 19, 1933, 40 cents. **Lytton Springs:** Magnolia, effective July 7, 1933, 60 cents; **Mirando:** effective June 19, 1933, 40 cents by Humble and effective July 7, 1933, by Magnolia, 55 cents. **Pettus:** effective June 19, 1933, 55 cents. **Refugio Heavy:** effective June 19, 1933, 45 cents. **Refugio Light:** same as Gulf Coast. **Saxet:** effective June 19, 1933, 45 cents.

North Louisiana and Arkansas:

Caddo, Homer, Haynesville, Bull Bayou, Sabine, Crichton, DeSoto-Red River, Cotton Valley, Sarepta, Cartersville, Pine Island, El Dorado, Rainbow Light: effective May 3, 1933, 25 cents.

Effective June 19-20, 1933, Texas Co., Gulf, Magnolia: schedule Oklahoma, Standard of La., effective June 19, 1933; Caddo below 29 gravity 26 cents, 29-29.9 gravity 28 cents, and 2-cent diffential to 50 cents for 40 gravity and above; Homer, below 29 gravity 32 cents, 29-29.9 gravity 34 cents, and 2-cent differential to 56 cents for 40 gravity and above; Haynesville below 29 gravity 29 cents, 29-29.9 gravity 31 cents, and 2-cent differential to 53 cents for 40 gravity and above; Sabine and DeSoto, including Zwolle, Sarepta and Cartersville, below 29 gravity 35 cents, 29-29.9 gravity 37 cents and 2-cent differential to 59 cents for 40 gravity and above; El Dorado, Arkansas, below 29 gravity 37 cents, 29-29.9 gravity 39 cents and 2-cent differential to 61 cents for 40 gravity and above.

Smackover, Arkansas: Effective June 9-20, 1933, 30 cents flat.

Rocky Mountain States:

Salt Creek: July 6-8, 1933, same as Oklahoma. **Elk Basin and Grass Creek:** July 8, 1933, 72 cents. **Big Muddy:** July 8, 1933, 55 cents. **Lance Creek:** Dec. 16, 1932, 92 cents. **Rock Creek:** July 8, 1933, 54 cents. **Sunburst:** July 8, 1933, 90 cents. **Osage:** Jan. 18, 1933, 52 cents. **Cat Creek:** May 6, 1933, 35 cents. **Pondera:** May 9, 1933, 55 cents. **Hogback, N. M.:** May 8, 1933, 50 cents.

Mid-Western States: (Effective July 12, 1933).

Lima: 95 cents; **Illinois:** 90 cents; **Princeton:** 90 cents; **Western Kentucky:** 85 cents.

PENNSYLVANIA: (Effective July 6, 1933).

Bradford District: $1.70; **National Transit Oil:** $1.70; **Southwest Pennsylvania Pipe Line Oil:** $1.37; **Eureka Pipe Line Oil:** $1.32; **Buckeye Pipe Line Oil:** $1.17; **Corning Crude:** 80 cents.

MICHIGAN: (Dec. 31, 1932). **Midland:** 95 cents; **Muskegon:** 76 cents to $1.00.

Canada: (Effective Jan. 18, 1933). **Petrolia:** $1.75; **Oil Springs:** $1.82.

California—Posted by Standard Oil Company. Effective June 26, 1933

Gravity	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
14-14.9	$ .55	$ .55	$ .55	$ .55	$ .55	$ .55	..	..	$ .55	$ .55	$ .55	$ .55	$ .55	..	$ .52	$ .52	$ .52	$ .52	$ .52	..
15-15.9	.55	.55	.58	.58	.55	.58	..	..	.55	.55	.55	.55	.55	..	.52	.52	.52	.52	.52	...
16-16.9	.55	.55	.61	.61	.52	.61	..	..	.57	.55	.57	.55	.55	..	.52	.52	.52	.52	.52	..
17-17.9	.57	.55	.63	.64	.61	.64	..	..	.60	.59	.60	.55	.57	..	.52	.52	.53	.52	.52	..
18-18.9	.60	.56	.65	.67	.64	.67	..	..	.63	.62	.62	.55	.60	..	.52	.52	.56	.52	.52	..
19-19.9	.63	.60	.68	.70	.67	.69	..	..	.65	.66	.65	.55	.63	..	.52	.54	.59	.52	.52	..
20-20.9	.66	.63	.71	.73	.70	.72	..	..	.68	.69	.68	.55	.65	..	..	.57	.62	.53	.52	..
21-21.9	.69	.67	.73	.77	.73	.75	..	..	.70	.72	.71	.58	.68	$ .60	..	.61	.65	.56	.55	..
22-22.9	.71	.70	.76	.80	.76	.77	..	..	.73	.75	.74	.60	.71	.64	..	.65	.68	.59	.57	..
23-23.9	.74	.73	.78	.83	.79	.80	$ .68	..	.75	.78	.76	.64	.73	.67	..	.69	.70	.61	.60	..
24-24.9	.77	.77	.81	.86	.82	.83	.71	..	.78	.82	.79	.67	.76	.70	..	.72	.73	.64	.63	..
25-25.9	.80	.80	.83	..	.85	.85	.75	..	.80	.85	..	.71	.79	.73	..	.76	.76	.67	.66	..
26-26.9	.82	.83	.86	..	.88	.88	.79	..	.83	.88	..	.75	.82	.76	..	.80	.79	..	..	..
27-27.9	.85	.87	.88	..	..	.91	.82	..	..	.92	..	..	.84	.80	..	.83	.81	..	..	..
28-28.9	.88	.90	.91	..	..	.94	.86	..	..	.95	..	..	.87	.83	..	.87	.84	..	..	..
29-29.9	.90	.93	.93	..	..	..	.89	..	..	.98	..	..	.90	.86	..	.91	.87	..	..	..
30-30.9	.93	.97	.96	..	..	..	.93	..	..	..	..	..	.93	.89	..	.95	.89	..	..	..
31-31.9	..	..	..	..	..	..	.97	..	..	..	..	..	.95	.92	..	.98	..	..	..	..
32-32.9	..	..	..	..	..	..	1.00	..	..	..	..	..	.98	.96	..	1.02	..	..	..	..
33-33.9	..	..	..	..	..	..	..	$ .91	..	..	..	..	1.01	.99	..	1.06	..	..	..	.76
34-34.9	..	..	..	..	..	..	..	.94	..	..	..	..	1.03	1.02	..	..	..	..	..	.78
35-35.9	..	..	..	..	..	..	..	.97	..	..	..	..	..	1.05	..	..	..	..	..	.80
36-36.9	..	..	..	..	..	..	..	1.00	..	..	..	..	..	1.08	..	..	..	..	..	.82
37-37.9	..	..	..	..	..	..	..	1.03	..	..	..	..	..	1.11	..	..	..	..	..	.84
38-38.9	..	..	..	..	..	..	..	..	..	..	..	..	..	1.14	..	..	..	..	..	.86
39-39.9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Subject to field-gathering charge of 5c per barrel.

F. O. B. Ship

1. Signal Hill. 2. Seal Beach, Alamitos Heights. 3. Huntington Beach. 4. Inglewood. 5. Playa Del Rey. 6. Olinda-Brea Canyon. 7. Athens-Rosecrans-Dominguez. 8. Elwood Terrace. 9. Torrance. 10. Richfield. 11. Whittier, La Habra. 12. Montebello. 13. Coyote Hills. 14. Santa Fe Springs. 15. Newhall, McKittrick, Kern River. 16. Midway-Sunset, Elk Hills, Buena Vista Hills. 17. Lost Hills. 18. Coalinga. 19. Wheeler Ridge. 20. Kettleman Hills.

The Selection of East Texas Pumping Equipment

(*Continued from page 38*)

this area showed that the drainage area was essentially circular. Had the force propelling the oil from the sand to the bottom of the hole and from the bottom of the hole to the surface, been from the west, the direction where the water is found, the pressure decline would not have been circular but oblong, in the form of an elongated elipsoid.

To illustrate further this point, petroleum engineers, who were present during development of the Powell and Mexia fields, and observed the wells in those fields, state that at the completion of a well it was permitted to produce unrestricted until it ceased to flow, then immediately put on the pump, at which time it would pump for a short while at a good rate of production until it exausted. The well would be dead for several days in a state of exaustion until the effect of the water drive had reached the well, at which time the production would be increased to two or three hundred barrels per day, followed by the well making a large per cent of water. Obviously, in the above example, the force which was propelling the oil was the gas energy which was dissipated and the latter replaced by the water drive from two to three weeks later. Such examples as this and the ones illustrated above in the East Texas field, shows that the water was unable to keep up with the dissipation of the gas energy, lagging some two or three weeks behind. In addition to these simple, practical illustrations, the following data is presented on the East Texas field, relative to the amount of water that has been produced and the status of the water table at this time:

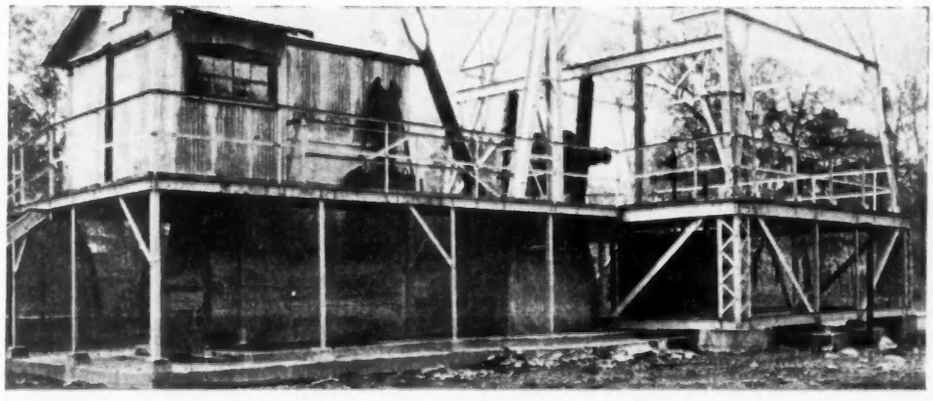
There are 234 wells which have been drilled to a sub-sea depth of 3305 to 3310 feet. Fourteen of the 234 wells are making water, the remaining are clear. There are 228 wells which were drilled to a sub-sea depth of between 3310 and 3315 feet. Of this number, 34 are making water; the remaining are clear. There are 146 wells which were drilled to a sub-sea depth of 3315 to 3320 feet. Forty-six of which are making water; the remaining 100 clear. There are 139 wells which have a total sub-sea depth of below 3320 feet sub-sea. Of this number, 73 are making water, and the remaining 66 clear. In addition to this data there are a few scattered water wells on which we do not have the sub-sea data, however, the number with the incomplete data would be less than 20 per cent of the total. An analysis of the above statement of facts leads to the conclusion that it is indeed remarkable that the water table has risen so slightly. It appears from this data that the total rise to date is certainly less than five feet and probably about four feet. The East Texas field has produced approximately 350,000,000 barrels of oil. Had the water been the driving force in the field it would have replaced essentially all of this oil and the water table would have risen approximately 15 feet. Had the water table risen 15 feet in a uniform manner it would have completely drowned out approximately 750 wells. Had it risen an average of 15 feet in an irregular manner, (All of the evidence shows that the rise has been very irregular) it would have drowned out a larger number than 750 and probably as many as 1000. Of the 10,300 oil wells producing in the field, 285 are producing from a trace (less than one per cent) of water to as high as 75 per cent water. Of the 285 which are showing water in the field, nine have been temporarily abandoned. Some of those which have been abandoned may produce considerable oil when properly equipped for lifting. A study of the chart showing the relation of salt water production to the oil production, shows that although the field has produced approximately 350,000,000 barrels of oil, an amount equivalent to 18 per cent of its estimated ultimate recovery, it is still producing less than two per cent water; the total water production being, at this time, between 13,000 and 14,000 barrels, daily.

The Relation of Salt Water to Pumping Equipment

It is indeed regrettable at this time, when pumping equipment is being installed and the question of what kind of equipment must be installed, the question must be answered as to whether or not the wells are going to have to pump considerable water with the oil. A projection of the curves in the chart above referred to, is highly speculative because we can not tell exactly what will happen in the future by a comparison with the past. However, it is indeed interesting to project the curve of water production for 2½ to three years hence, and see what it shows. The writer has done this in dotted lines on the chart. The projected curve indicates that by January, 1936, the field will be making 2.8 per cent of water with a probable total water production of 30,000 barrels per day. At the present rate of production, namely 750,000 barrels per day, the field will have produced by January 1, 1936, 1,032,000,000 barrels of oil. The above data is highly speculative and should be so considered, however, it is based upon certain facts which have been accumulated during the past 2½ years. It is believed to be as reliable a guide as is available at the present time.

The Abundance of Water in the Woodbine Basin

The following facts are outlined regarding the amount of water in the entire Woodbine basin. First, the area cov-



Superior Oil Company's Ingram lease in East Texas, subject to flooding and derrick is built on steel frame sub-structure and pumping equipment set up on concrete base. Installed by Dewey T. Ross, Tyler, Texas.

ered by the outcrop of the Woodbine formation totals 1,056,640 acres. In other words, the edge of the Woodbine sand comes to the surface between Fort Worth and Dallas and extends in a north direction to the Red River where it swings east and follows along the river for many miles. The outcrop of the formation is several miles wide and 200 miles long. The area underlain by the sand between the point of outcrop and where it dips below the 3320-foot sub-sea structural contour is 8,418,560 acres. The area below the 3320-foot sub-sea structural contour, in what is commonly called the "bottom of the basin" is 3,822,272 acres. In other words, the area at the bottom of the basin using the water level as the dividing line between the bottom of the basin and rim of the basin is 3,822,272 acres. The area forming the rim of the basin is 8,418,560 acres and the area of the outcrop of the formation is 1,056,640 acres, giving a total area of 13,297,472 acres. The Woodbine formation varies in thickness from a few feet to a maximum of 800 feet. The Woodbine formation is 25 to 50 per cent porous sand stone, having porosity of approximately 25 per cent of its total volume. It will be interesting to estimate the rate at which water could percolate into the sand at the outcrop, due to rainfall, as well as estimate the amount of water in this enormous structural basin. The average rainfall at the outcrop of the Woodbine formation is approximately 36 inches per year. The topography in the area of the outcrop is wooded and ruggedly underlain with a sandy soil. This type of topography and soil would probably absorb from five to 15 per cent of the total rainfall. An average of 10 per cent of the total rainfall would give 3.6 inches of water per year or 2333 barrels per acre. This amount times 1,056,640 acres would give a total intake of water at the surface of the Woodbine outcrop of 2,465,141,120 barrels per year or an amount equivalent to 25 per cent more than the estimated total ultimate production of the field. Thus, the question of the availability of the water in so far as rainfall is concerned can not be disputed.

Assuming that the Woodbine formation has an average sand thickness of 100 feet over the entire basin and a porosity of 25 per cent, the voids between the sand grains would hold on an average, 256,964 barrels per acre, or a total of 3,436,971,597,008 barrels of water. Obviously, if one tenth of one per cent of this amount of water should find its way into the East Texas field it would be flooded completely long before the estimated recoverable reserve had been extracted. With these basic estimates in mind, there seems to be one cause which would prohibit such a volume of salt water from finding its way into the field, thereby flooding it completely. That one factor is the permeability of the sand or the ability of the sand to transmit water at a rate which the oil is being produced. There is no doubt in the mind of the author that eventually the field will be completely flooded by water, however, there is doubt that the producing life of the field would be a sufficient time necessary to flood the field. In other words, it may require 20 years, it may require 100 years, or it may require 1000 years for the water to seep through the sand between the grains and completely flood the field.

In my opinion, there never will be one drop which enters the outcrop at the surface of the Woodbine formation, find its way into the East Texas field, during the limited amount of time which an oil field is economically profitable to operate.

Proposed Methods of Disposing of Water Production

A great many methods have been proposed for disposition at the water from the field. One of the earliest and most fanciful ideas was advanced during the first year of the development of the field at which time a large pipe line leading to the Gulf of Mexico was proposed which would have been constructed at a cost of several million dollars. At the same time, visionary engineers proposed to dig a canal along the course of the Sabine River to the Gulf of Mexico at a cost of several million dollars. At the present time the small amount of water is adequately cared for by flowing it into a series of earthen storage tanks which are from five to 10 feet deep and will hold all of the water produced from wells in the immediate vicinity of the tanks. During the season of heavy rainfall these salt water storage tanks are turned loose and the per cent of salt water to that of rainfall is so small that it has no detrimental effect on the water and its uses in the Sabine River or its tributaries. The water production in the field is fairly uniformly distributed around the periphery of the field on the west and northwest siles. Theh entire distance around the water side of the field is 65 miles. With such a long water line it seems that the method now used will probably be adequate for the disposing of the water for at least two or three years to come. However, the time may arrive within a few years when it will become necessary to dispose of this water by some other method. Although there is every reason to believe that by carefully prorating the amount of water that can be turned loose into the water system of Sabine River, that the present method can be successfully used for many years.

As a matter of conservation, in maintaining the pressure and recovering the greatest amount of oil, a plan may be worked out whereby the water which is being produced from time to time will be pumped back into the wells on the west side of the field which have gone to water or which could be drilled, especially for intake, and returning to the

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sand the same water which it originally produced. It will require some experimentation to determine whether the sand will take water without increasing the pressure in the intake considerably above the hydrostatic head. Some calculations on this part of the project are given below. Thus, in the town of Overton and in that vicinity, the wells have a depth of approximately 3800 feet. Salt water weighs slightly over 43 pounds per hundred feet. This would give 1634 pounds per square inch pressure in the bottom of the hole due to the weight of the column of water. At the present time, the bottom hole pressure in the same area is 1350 pounds. This would give a differential pressure in the bottom of the hole of 284 pounds without any increased pressure at the surface by means of a pump or compressor. There is no doubt but what water will go into the sand with the differential pressure of 284 pounds. The only question is how far into the sand it will go. At the present time, along the water front, it seems very likely that by the time a large amount of water is being produced from the field, that the bottom hole pressure along the west side of the field near the oil, water contact, will be approximately 1100 to 1200 pounds at which time a differential pressure between the hydrostatic column due to the hole being filled with water, and the reservoir pressure will be 400 to 500 pounds per square inch.

There are many other interesting phases of this water disposal system but time does not permit discussion in this article. Suffice to say that from the engineer's viewpoint, there is every reason to believe that the water in East Texas will be disposed of by the method now used in the field or the one above outlined in which the water is returned to the sand as fast as it is produced. The latter offers considerable advantages over the first in that higher pressures are maintained in the reservoir, thereby lessening the pumping cost.

It may be interesting to note that there are a number of wells on the east side of the field making salt water. The east side water is coming from the Georgetown limestone and has no relation to the water drive on the west side of the field.

Conclusion

The flowing life of the East Texas oil field may best be stated in the following way: Approximately 500 wells per month are expected to be added to the pumping list, at an average cost of $4500 each or $2,250,000 per month. This amount of expense can easily be paid out of current income derived from the sale of oil at the present market price, thereby assuring the supply house regular monthly payments on pumping equipment.

The wells which will go on the pump first are in the thin sand areas along the east side, in densely drilled areas, and along the northwest flank of the Gladewater uplift. New pumping wells will in general be grouped around those wells which are now pumping.

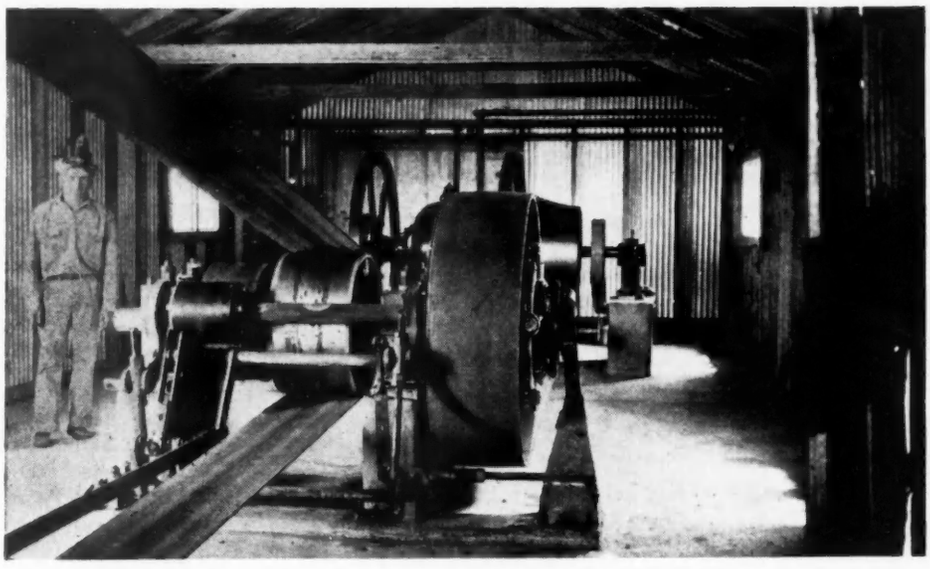
The salt water problem in the field at present is small.

Should the salt water encroachment become more rapid in the future, a plan whereby the water is returned to the producing sand is believed to be reasonable and thoroughly practical.

A great deal of unnecessary expense can be saved by following the three classifications of pumping equipment shown on the accompanying map.

The primary propelling agent in producing the oil in East Texas is the expansion of the gas associated with and absorbed in the oil.

The Woodbine basin is estimated to have a surface area of 13,297,472 acres and a volume of water of 3,436,971,597,008 barrels. Ultimately this water will flood the entire East Texas field. It may require 10 years, 100 years or 1000 years for the entire field to be flooded. One thousand years is but a second in the geologists' time table.



This Mid-Kansas Oil & Gas Company pumping installation near Henderson, includes drive by single cylinder gas engine and standard rig countershaft. This installation, by Oil Country Specialties Manufacturing Company, includes a new friction reverse, making the usual cross belt reversing mechanism unnecessary.

Washington Moves to Enforce "Hot Oil" Order

(Continued from page 9)

that the oil code hearing would not begin until July 24. This was the date understood to have been originally fixed for the hearing, but it was yesterday advanced to July 20. Return of the hearing to its later date was decided upon in order to permit preliminary conferences to make further efforts to harmonize differences between the several factions. Everett L. De Golyer, past president of the American Association of Petroleum Geologists, has been named as special technical adviser to Deputy Administrator Simpson, and Dr. Joseph E. Pogue of New York, formerly a member of the first Volunteer Committee on Petroleum Economics of the Oil Conservation Board and assistant director of the Bureau of Oil Conservation in the war-time fuel administration, will be deputy economist, to serve during the oil hearings, it was announced.

Houston, July 14.—Permanent benefit of the executive order may be in doubt but there have been immediate results. Before the wires had ceased humming about the order, there was a rush to get oil stored along the Texas Gulf Coast on its way to Atlantic points. Owners, especially brokers, feared an investigation that might be retroactive.

In the East Texas field tank car shipments across state lines came to a standstill the day following the signing of the order. All types of shippers were hesitating about what to do and for the moment chose to do nothing rather than take a chance.

Buyers of gasoline at East Texas refining centers adopted the precaution of having sellers of this gasoline sign an affidavit to the effect that the gasoline was not made from crude oil produced in excess of the order of the Texas Railroad Commission. Signing an affidavit has been a mere formality in East Texas and it may be that men are still signing them without regard to whether they later will face a federal judge or a state judge.

The effect of all this was a sudden rise in gasoline prices in East Texas. At the close of the week the price of third grade motor fuel seemed headed for four cents a gallon. A week before the price was weak at three cents a gallon.

Halting gasoline shipments interstate, however, may finally make the situation worse locally. If the interstate market is restricted these refiners will have more gasoline to sell within the borders of Texas.

Since the East Texas field is the chief spot of concern, all eyes have been centered there since the President signed his executive order. There may be violations elsewhere in Texas and in other states where proration has a constitutional standing but the petroleum industry realizes that a correction in East Texas will remove a burden that has been borne so long that it has about come to be a part of the industry's anatomy.

Estimates of what amount of oil enforcement of the order will influence vary and the variation goes up and down in accordance with the price the estimator is paying for East Texas oil. Those paying the highest posted price place the total amount of excess oil in East Texas at 150,000 barrels daily. Those still paying the old 50-cent price place the excess around 250,000 barrels daily.

Evidently there are 200,000 barrels of production in East Texas in excess of the 550,000 specified in the order of the Texas Railroad Commission. At least half of this has been moving interstate either as crude oil or refined products.

With enforcement the output of the field can be cut down at least 100,000 barrels daily.

But the sort of enforcement many are anxious to have would bring the output of the field down to the level of the commission's order over night. These men want a few indictments. They believe the chance of facing a federal judge will stop illegal production in East Texas.

Field Trips to Follow Geological Session

Tulsa.—The sixteenth session of the International Geological Congress will be held in the United States this year for the first time, convening at Washington, D. C., on July 22.

In connection with the program about 30 trips are to be made through various sections of the country. Among these is trip No. A-6, which is scheduled to leave Tulsa July 13. Going to Oklahoma City by the way of Cushing, delegates will be shown the Oklahoma City pool under the direction of H. H. Charles, Indian Territory Illuminating Oil Company. After leaving Oklahoma City the group will be conducted through the Arbuckle Mountain region by C. W. Tomlinson of Schermerhorn-Ardmore Oil Company. At Ft. Worth the trip will be directed by Gale Scott of Texas Christian University and the group will then visit the East Texas field under the leadership of Dr. Frederic H. Lahee and the Van field under W. E. Wrather.

Following inspection of North Texas fields, the delegates will journey to the Palestine and Keechi salt domes on July 18 and the Sugarland field on the following day under direction of L. P. Teas. The 11-day tour will be concluded with a trip to Boling Dome under direction of A. G. Wolf, after which the delegates will return to Washington.

Local arrangements are under the direction of Frank R. Clark, chief geologist for Mid-Kansas Oil & Gas Company and president of the American Association of Petroleum Geologists. The route and transportation committee is made up of W. Z. Miller, H. H. Wright, M. R. Keiss, W. J. Allen, Frank R. Clark, Stanley B. White, and W. E. Horkey. W. J. Allen, Dr. Ed Bloesch, and Dr. Chas. Ryniker will act as linguists. Among the foreign visitors registered for the trip are Prof. Ramiro Fabiani, Instituto Geologico R. University, Palermo, Italy; Dr. Alfred Bentz, Invalidenstrasse 44, Berlin, N. 4, Germany; Yoshinosuke Chitani, Imperial Geological Survey of Japan, Tokio; I. M. Goubkine, director, United Geological and Prospecting Service, USSR, Moscow; Dr. Louis de Loczy, Stephania ut 14, Budapest VII, Hungary; Mrs. Louis de Loczy; Dr. Hans G. Gugler, Natural History Museum, Basle, Switzerland; Ezequiel Ordonez, Abraham Gonzalez 79, Mexico City, Mexico; and B. P. Nekrasoff, United Geological and Prospecting Service, USSR, Moscow.

Three Oklahoma geologists will appear on the program at Washington. A. I. Levorsen, will present, "Studies in Paleogeology," and Frank R. Clark, "Origin and Accumulation of Oil." Robert H. Dott will present "Structural History of Arbuckle Mountains of Oklahoma." All of these papers have been presented on programs of the Tulsa Geological Society.

El Dorado, Ark.—A total of 464,769 barrels of East Texas crude was received at Arkansas refineries during the month of June, all of which except 124,500 barrels of The Texas Company, was moved by Atlas Pipe Line Company's line.

Receipts for the month from East Texas were divided as follows: The Texas Company, 124,500 barrels (at Louann); Spartan Refining Company (Atlas), at Griffin, 5,604 barrels; Lion Oil Refining Company, 182,930 barrels; Ouachita Valley Refining Company, 75,305 barrels; Root Refining Company, 76,430 barrels.

Crude Output in May Is Highest in Three Years

DURING May United States crude oil production was at the highest daily average since October, 1929, it is revealed in the latest monthly report of the Bureau of Mines. Total for the month was 84,747,000 barrels, or a daily average of 2,734,000 barrels, an increase of 557,000 barrels over the daily average of the previous month.

The higher output in May was due primarily to a large gain in East Texas, where operations had been suspended during most of April. The field averaged 890,000 barrels daily in May compared with 349,000 barrels in April.

Among other fields showing higher production in May were Conroe, with 78,000 barrels daily average compared with 43,000 barrels in April, and Oklahoma City averaging 135,000 barrels daily against 104,000 barrels.

Field activity in East Texas and Conroe continued around April rates with three oil wells completed daily in East Texas and two daily at Conroe, but for the rest of the country the average declined.

Stocks of crude oil increased materially in May, since increased production was offset only partially by larger crude runs to stills. Stocks of refinable crude on May 31 totaled 343,588,000 barrels, or over 7,000,000 barrels more than at the beginning of the month. In April there had been heavy withdrawals from stocks.

Refined Products

Although runs of foreign crude to stills rose considerably, a rise for domestic crude was mostly responsible for an increase in daily average crude runs from 2,294,000 barrels in April to 2,398,000 barrels in May. This fact, with a 1933 high mark of 44.2 as percentage yield for gasoline, resulted in a substantial gain in production of motor fuel.

The indicated domestic demand for motor fuel totaled 33,999,000 barrels, or six per cent above a year ago, but exports were only 2,129,000 barrels, or less than half of the total for May, 1932. Total demand for May, 1933, was 36,128,000 barrels, or nearly 500,000 less than a year ago. Stocks of motor fuel on May 31 totaled 59,033,000 barrels, of which nearly 4,000,000 barrels was natural gasoline. This figure indicates that stocks of motor fuel declined 661,000 barrels in May, 1933, a relatively better showing than in May, 1932, when a small increase was recorded.

Statistics of kerosene showed little change, but domestic demand for gas oil and fuel oil showed the usual seasonal decline. The indicated domestic demand for lubricants continued its rapid increase from the low of January.

Refinery data for the report were compiled from refineries with aggregate daily recorded crude oil capacity of 3,463,110 barrels. Those plants operated in May at 69 per cent of their capacity, given above, compared with a ratio of 67 per cent for April.

Supply and Demand of All Oils

From Bureau of Mines May Report

(Including wax, coke, and asphalt in thousands of barrels of 42 U. S. gallons)

	May, 1933	April, 1933	May, 1932	Jan.-May, 1933	Jan.-May, 1932
NEW SUPPLY:					
Domestic Production:					
Crude petroleum	84,747	65,313	68,523	350,389	332,797
Daily Average	2,734	2,177	2,210	2,320	2,189
Natural gasoline	2,776	2,674	3,079	13,640	15,869
Benzol[1]	105	89	95	465	544
Total production	87,628	68,076	71,697	364,494	349,210
Daily average	2,827	2,269	2,313	2,414	2,297
Imports:					
Crude petroleum	2,206	2,910	5,089	14,119	24,375
Refined products	653	1,354	2,874	6,303	18,671
Total new supply, all oils	90,487	72,340	79,660	384,916	392,256
Daily average	2,919	2,411	2,570	2,549	2,581
Increase in stocks, all oils	9,555	[2]4,449	1,525	10,093	4,577
DEMAND:					
Total demand all oils	80,932	76,789	78,135	374,823	387,679
Daily average	2,611	2,560	2,520	2,482	2,551
Exports:					
Crude petroleum	2,678	2,939	2,942	11,577	11,388
Refined products	5,499	6,732	8,891	28,445	36,636
Domestic demand, all oils	72,755	67,118	66,302	334,801	339,655
Daily average	2,347	2,237	2,139	2,217	2,235
Excess of daily average domestic production over domestic demand	480	32	174	197	62
STOCKS (end of month):					
Crude petroleum:					
East of California	304,866	296,983	325,302	304,866	325,302
California[3]	38,722	39,516	42,737	38,722	42,737
Total refinable crude	343,588	336,499	368,039	343,588	368,039
Natural gasoline[4]	3,966	3,590	4,270	3,966	4,270
Refined products[3]	250,648	248,558	264,891	250,648	264,891
TOTAL STOCKS, ALL OILS	598,202	588,647	637,200	598,202	637,200
Days' supply	229	230	253	241	250
Bunker oil (included above in domestic demand)	2,726	2,826	3,242	13,845	16,344

[1] Based upon production of coke reported to Coal Division by those by-product coke plants that recover benzol products.

[2] Decrease.

[3] California heavy crude and residual fuel included under refined products.

[4] Includes motor blends held at natural gasoline plants.

Stanolind Plans 76 Miles Of Line Around Houston

Houston, Texas, July 15.—Shipments have been started by eastern mills on about 76 miles of 10- and 12-inch steel line pipe to be used by Stanolind Pipe Line Company, transportation unit for Standard Oil Company (Indiana), in building a pipe line system radiating to the north, south and east by south from Houston. A portion of this project announced early last month, is to consist of a 31-mile 12-inch extension from Sinco terminal near Houston to the Texas City refinery site of the Pan-American Refining Corporation, another Standard of Indiana controlled company. This Sinco-Texas City unit was originally expected to use 10-inch pipe. The bulk of the right of way has been bought.

The balance of the pipe line project not heretofore made public will involve

the building of 45 miles of 10-inch line, extending south from Hufsmith station located in the Tomball field parallel to the company's old Mid-Continent Sinco system made up of looped eight-inch and single 10-inch units, to Dawes Switch on the T. & N. O. railroad about eight miles northeast of Houston, thence east by south to Baytown tank farm and refinery of the Humble Oil & Refining Company.

Loops Probable

Stanolind Pipe Line Company has facilities to transport up to 40,000 barrels of crude daily from Mexia and other points north to Hufsmith station. It is believed that the company will throw in additional loops between Mexia and Hufsmith stations to augment the capacity but nothing definite has been made public on such plans. Extension of the company's trunk line facilities to Baytown is reported to have been made necessary through Standard of Indiana and affiliated units having made contract for Humble Oil & Refining Company to process a quantity of crude daily until the Texas City refinery now under construction can attain a capacity of 50,000 barrels daily. This plant is scheduled to place the first complete skimming and cracking unit in operation early next year, while construction work will continue until the capacity is eventually brought up to the 50,000-barrel level.

Leading pipe line contractors have been supplied with maps and detailed specifications to submit bids on laying the new lines authorized by Stanolind Pipe Line Company, which maintains headquarters at Tulsa. R. S. Ellison is president of the company and W. L. Heltzel is general superintendent. O. H. Powell is superintendent of the Texas division with headquarters at Fort Worth.

Many from Texas on Trip Of Shreveport Geologists

Shreveport, La.—Approximately 50 geologists, the majority from Texas and Oklahoma, were on the tenth annual field trip of the Shreveport Geological Society on July 8 and 9. The trippers visited points in Caldwell and Catahoula Parishes near the Angelina-Caldwell Flexure. George W. Schneider, president of the society, and M. W. Grimm, district representative of the A.A.P.G. expressed the belief that the large number of Texas geologists on the trip would make for better understanding of correlations of names of formations in Louisiana, Mississippi and Alabama, with other names of similar formations used in Texas.

R. T. Hazzard of Gulf Refining Company was trip chairman.

Bryant Withholds Decision On East Texas Proration

Tyler, Texas.—No action has been taken by Judge Randolph Bryant on the suit filed here July 10 in the United States District Court, Eastern District of Texas, by Overton Refining Company and 42 other producers for an injunction against the Texas Railroad Commission from enforcing its proration rules in the operation of the plaintiff's properties in the East Texas field. The petitition was filed by F. W. Fischer, Tyler attorney who has been active heretofore in representing the same group in contesting the validity of proration restrictions as imposed by the state.

The plea for relief from proration restrictions alleges "that current order is void for the reason that the commission acted in excess of its authority in promulgating same for the reason that it has no relation to the prevention of waste." It is further charged that "the present order is but an attempt on the part of the commission to curtail the production of oil to increase the price."

Two Geological Papers On Western Missouri

Rolla, Missouri.—Production of oil and gas in western Missouri has constituted the most important and recent development of the mineral resources of the state and has established a mineral industry of importance.

Field work by geologists of the Missouri Bureau of Geology and Mines has been undertaken to obtain data regarding the producing horizons, the geologic structure, and the general geology of the area and the pools developed to date. Results of this investigation are embodied in two short reports just issued by the Bureau, i.e., "Oil and Gas Pools of Western Missouri," by F. C. Greene, and "The Geology of the Blue Springs Gas Field, Jackson County, Missouri," by Glenn G. Bartle.

The first report describes an area extending from southwestern Vernon County northward, through Vernon, Bates, Cass, Jackson, Platte, Clay and Clinton Counties. Detailed descriptions of the geologic section in which the producing horizons occur are given, and 15 pools are discussed in detail.

Structure contour maps of a number of pools accompany the report, and many typical well logs are given. The report also contains a large scale cross-section of the area showing the relation of the producing horizons, their names, general thickness, and position in the section.

The second report describes in greater detail the largest producing area. Among other features, production is noted from thick channel sandstones occurring in the Pleasanton formation. These sands have every appearance of similarity to the Warrensburg channel so well defined in Johnson County.

The production is all from shallow depths, seldom over 500 feet.

The reports may be obtained by addressing H. A. Buehler, State Geologist, Rolla, Missouri.

West Texas School Land Decision Won by State

Austin, Texas.—In awarding a judgment of $81,734.08 to the State of Texas in its bonus and rental suit against Shell Petroleum Corporation, Judge Charles A. Wheeler has rendered a decision which will probably affect most of the West Texas oil operators who operate School Land properties not leased directly from the state.

Attorneys for Shell Petroleum Corporation indicated that no appeal would be made, and that the judgment would be paid at once. The decision was based on a decision of the Supreme Court of Texas and defense attorneys believed an appeal would be useless.

Judge Wheeler sustained the contention of the state that landowners were not necessarily parties to the suit. He declared that all lands forfeited and repurchased under the forfeiture and repurchase acts of 1925 and 1926 also come under this classification, i.e., that the state is entitled to one half of any bonus and rentals, in addition to its usual royalties.

Assistant Attorney General Ralph Yarborough, who is handling the suits, said that similar actions against the Humble Oil & Refining Company, Continental Oil Company and Phillips Petroleum Company would be brought to trial next week.

The sum granted by the courts was determined after lengthy conferences between auditors for the state and Shell Petroleum Corporation.

Acid Results Raise Value Of Archer County Leases

Wichita Falls, Texas.—A higher valuation has been placed on leases producing from the saturated lime formation in the Anarene district, Archer County, since outstanding results have been scored repeatedly in making big producers through the injection of acid. W. B. Hamilton and associates, recent entrants into the area with a drilling campaign said to involve about 20 wells over the next few months, established a new production record when J. T. Longley 1 swabbed and flowed 50 barrels of oil per hour on four-hour gauge

after removing the head of oil that accumulated in treating with 1000 gallons of acid in lime at 1144-1156 feet. These operators' W. I. Pace 2 made a 125 barrel pumper last month after using 500 gallons acid at 1151-1163 feet.

Venturing close to a group of dry holes, Wheeler & Brashear's Jeffrey 1-B, located in northeast corner of S½ SW Section 50, T.E.&L. Survey, has established a new shallow oil pool for northern Young County in sand at 752-756 feet. This wildcat is about one mile from nearest production, and flowed by heads while awaiting installation of pumping equipment for an initial gauge.

Shreveport Refining Plant Adding New Equipment

Shreveport, La.— Contract has been signed by Spartan Refining Company of Shreveport with Alco Products Company, Incorporated, of New York for a complete cracking unit for installation at the Spartan's refinery at Jewella, a Shreveport suburb. The new equipment will be installed in place of old cracking equipment that has not been used for several years. The plant was originally built by Shreveport-El Dorado Pipe Line Company and went to Spartan when its parent company, Atlas Pipe Line Company, purchased Shreveport-El Dorado two years ago. The Spartan refinery has a daily capacity of 10,000 barrels in its skim plant.

Atlas Pipe Line Company recently purchased the Soady Building on Market Street, Shreveport, a two story brick structure for a future home. These companies main offices at present are domiciled on the 14th floor of the Slatter Building.

New Air-Gas Lift Unit To Be on Market Soon

Two engineers of Houston soon will put on the market a new type air-gas lift apparatus which utilizes bottom hole pressure of 35 pounds, or more, in operation, they claim.

In contrast to air-gas lift equipment previously developed and in use, the new apparatus will employ no moving parts, and hence wear on parts will be reduced to the natural minimum occasioned by the erosive action of foreign particles within the fluid.

According to the inventors, the development allows performance with a minimum oil-gas ratio, and provided bottom hole pressure of as much as 35 pounds is available, operation of the unit is automatic.

From observation of the model it appears no back pressure will be exerted on the sand, hence, theoretically, there should be no disturbance of oil at the sand level.

The inventors claim that in the event 35 pounds pressure is not available to make performance of the lift automatic, arrangements for injection of air are such that the cost thereof would run low in relation to costs commonly associated with providing this auxiliary power.

Shamrock Building Gasoline Plant in Texas Panhandle

Amarillo, Texas.—Shamrock Oil & Gas Company, pioneer operator in the Texas Panhandle with headquarters here, has contracted for the erection of a 50,000,000 cubic foot daily capacity well pressure absorption gasoline manufacturing plant to be situated on the company's J. A. Shorey lease, NE Section 187, Block 3T, T&NO Ry. survey, Moore County. The company has a 40,000,000 cubic foot gasser on this property that has been shut in since completion in August, 1930, and has arranged for other gas connections in the Dumas area. A compressor unit is to be added to the company's well pressure absorption plant in the Pampa district, Gray County, where an output of about 4100 gallons of gasoline daily prevails.

Previously announced plans of Shamrock Oil & Gas Company to erect a 1200-barrel daily crude refinery on producing properties in the Pampa-Lefors district, Gray County, are to be carried out, according to officials. It will be located on the Fort Worth & Denver Railroad.

Deny Request for Open Test On East Texas Pumpers

Austin, Texas.—Efforts of East Texas operators to determine the potential capacity of pumping wells in the field by making 30-day open flow tests, have so far met with failure.

Applications for such tests have been received by the railroad commission at Austin, but upon the advice of engineers of the commission, these applications have been held up.

Operators requesting permission for such tests said they desired to determine whether or not their wells were marginal wells, i.e., whether they would make more than 20 barrels per day on the pump.

It was pointed out by the commission, however, that no well in East Texas is prorated below the marginal limit, 20 barrels per day. Thus, should it be determined that the wells in question could produce over 20 barrels, they would be subject to proration — if they could not produce this amount, they would still have an allowance of 20 barrels.

Western Gulf Will Drill North of Coalinga Field

Coalinga, Calif.— Western Gulf Oil Company has decided to drill a deep test on Section 15-17s-15e, about 10 miles north of the Coalinga field. The tentative location announced two weeks ago was on Section 3-17-15. A close study of geological conditions warranted the change. The company has under lease more than 100,000 acres in San Joaquin Valley, the present location having been made after an extensive core hole campaign was completed. Advocates of drilling in the bed of the valley are getting considerable satisfaction from the company's attitude. Geologists admit possibility of finding oil and gas fields where surface evidences are absent. Most California companies have become accustomed to drilling in hilly sections, but Lost Hills, Mountain View, Fruitvale and other recent discoveries have gradually changed the disposition to confine activity to structures showing on the surface. Most of the Southern California fields are located near hills, but Santa Fe Springs was a notable exception.

Wildcat North of Santa Fe Springs Is Abandoned

Los Angeles.—Abandonment of The Texas Company's Pico 1, wildcat test northwest of Santa Fe Springs on Section 13-2-12, was not a surprise, as a well known marker expected around 1600 feet was not found. The preliminary core hole was drilled to 2235 feet. A fossil bed marker was expected above 1700 feet. A well drilled several years ago north of the present location by Associated Oil Company found the marker at 2100 feet, and failure to pick up the stratum in The Texas Company's first test indicated a poor position on the supposed structure. The company will not drill further in the area. This district has been held in favor by various companies for some time, due to its location with reference to Santa Fe Springs and Montebello, but all wildcats drilled have had only nominal showings.

Ohio Oil Acquires Large Buena Vista Lake Acreage

Taft, Calif.—Ohio Oil Company has obtained leases or bought outright a large acreage in the Buena Vista Lake area, a low section east of the Midway-Sunset and Buena Vista fields, but only a limited amount of drilling will be done. The leases and fee purchases total more than 7000 acres. The land lies in Sections 29-, 30-, 31-, 32- and 33-31s-26e, and Sections 25- and 26-31s-25e. Some development will have to be done on the leased acreage. The company some time ago completed a geophysical survey of the district, and was satisfied with the possibilities. A

well is being considered for Section 31-31-26, but the location is only tentative. The Buena Vista Lake district has been recognized as a promising area, but most of the accumulations along the west side of the valley have been found in the hills near the extreme edge of the vast fill. Production has been found near the lake, but the east side has not been drilled enough to eliminate it. Kern River empties into Buena Vista Lake and is lost to evaporation, since the lake has no outlet.

Deep Kettleman Hills To Be Cleaned for Test

Coalinga, Calif.—North Kettleman Oil & Gas Company's Lillis-Welsh 1, record test two miles northwest of the North Dome, will be cleaned out to a point below the shoe of the seven-inch casing at 9642 feet and tested again to check the flow of water and to determine the value of streaks of oil sand below the shutoff. The three-inch drill pipe has been removed to 9654 feet, but the small amount of hole clear below the shoe of the seven-inch is not considered enough to warrant a test. A premature shot in the drill pipe caused much trouble. A special string of left hand drill pipe is being used to remove a portion of the lost string. In drilling the last 100 feet, trouble was encountered. The extreme depth was against speed and safety of operations. The well was drilled to 10,944 feet with only a few fishing jobs. The present difficulty was the first which caused serious trouble. Cleaning out to bottom is a possibility, but deeper drilling may not be attempted. The original plan was to drill to 11,000 feet.

Series of Liners Gives Clue to Source of Water

Coalinga, Calif.—Solution of the water trouble in Superior Oil Company's Huffman 6, edge completion on the North Dome at Kettleman Hills, was an outstanding mechanical achievement which resulted in a flow of 10,000 barrels of clean oil from 9143 feet. This is a depth record for the field, so far as effective producing depths are concerned. The well flowed a large percentage of water during the first test. The complicated series of liners were cemented through perforations at 7580, 8115, 8360 and 8835 feet. The water was located at the top cementing point, and the flow was completely shut off. Cut of the oil was two tenths of one per cent.

Improvement in drilling practices has been outstanding at Kettleman Hills. Operators are drilling to completion depths in a fraction of the time required to complete the first half dozen producers. Fear created mental hazard in the beginning which was hard to overcome. Realization that the field is just an ordinary producing district in most respects has been the direct cause of successful development of the past two years.

Deep Test Planned for Shallow Newport District

Los Angeles.—The Newport district, last producing area in the long line of fields between Beverly Hills and the ocean, will be given another deep test by Nuoil Company, a small organization which will deepen Gessell 2 from 3850 feet. The well has been idle for some time. The derrick is being rebuilt and made taller for deeper drilling. The shallow Newport field was discovered in 1921, but the area never amounted to much. Peak production came in August, 1923, and daily average did not exceed 400 barrels from eight wells. The structure is a faulted monocline, and the small production came from the Miocene. Some of the oil was eight gravity, and the highest was only 12 gravity. Importance of the field lay in its position along the Newport-Beverly line, and in the possibility of deeper production. Major companies have drilled in and near the field, but no deep production was developed. Attempts to mine the shallow oil were made several years ago, but gas defeated these efforts.

Deeper Drilling Rewards Richfield Area Test

Los Angeles.—A flowing well has been completed in the Richfield field by J. O. Seeple, independent operator, who recently took over Breen 2, formerly owned by Associated Oil Company, and deepened it from 3450 feet to 3725 feet. Initial production was 650 barrels of 28 gravity oil and 2,000,000 cubic feet of gas. Fluid level rose to 2000 feet before the well started flowing. The Richfield field was not regarded as a good gamble in the deeper zones a few years ago, but developments on the edge tracts have been distinctly favorable. At least two major oil companies have quitclaimed or sold edge leases which had ceased to produce profitably.

California Well Yields Soda Water With Its Oil

Santa Paula, Calif.—The 1000-barrel flow of oil and 1500-barrel flow of soda water from Merchants Petroleum Company's Cochran 6, wildcat in the Sespe district, was an exceptional demonstration for such a shallow well. This test was drilled to 950 feet, and the flow of water and oil was much greater than expected. A heavier gas trap is being installed. This district has produced a heavy oil in the past and now has six active wells.

More Than a Third of California Wells Idle

Los Angeles.—Of the 15,786 oil wells in California, 6653 were idle on July 1. The number of leases in all fields totaled 2575, giving the state a very low average of wells per lease. Townlot leases with only one well per lease helped to make the average so low. The older and larger fields had the largest number of producers per lease.

Of the 3540 producers in the Midway-Sunset district, 1707 were idle on July 1. The number of wells on production has increased gradually in this area for several months. The Kern River field, a great producer 25 years ago, has 1500 idle wells and 737 active producers. This old field should not be taken as an example, however, as it produces a very heavy oil. The North Dome at Kettleman Hills has 43 producing wells and nine idle producers. San Joaquin Valley as a unit has 5000 idle wells and 4200 producing wells.

Los Angeles basin has 5185 wells capable of production, but of this total 1115 are idle. Huntington Beach with 183 idle producers leads the list, but the Torrance field is a close second with 176 idle producers. Long Beach has 1018 producing wells and 100 idle producers.

The old Santa Maria field has 257 idle producers and 130 producing wells. Ventura Avenue has 104 idle wells, as against only 153 now on production.

Most of the small and unprofitable producers in several fields have been idle for some time. In several fields, a large number of wells temporarily out of condition, have been thrown into the idle column.

Expect Increased Field Activity in California

Los Angeles.—Increased drilling operations in a few California fields have not yet been reflected in the completion column. One outstanding well was finished during the week, but a better average is expected for the future.

Company, Well and Location	Init. Prod. Bbls.	Depth
Huntington Beach—		
Richrow Corp., Severance 1	500	4496
Sierra-Huntington Oil Co., No. 118-1	400	4375
Kettleman Hills—		
Superior Oil Co., Huffman 6	10,000	9143
Long Beach—		
Lucky Strike Oil Co., No. 4.	150	4405
Los Angeles County—		
Texas Co., Pico 1, 13-2-12..	*	2235
Rincon—		
Indian Petroleum Corp., No. 82-2	50	3464

*Failures; †Junked; ¶Million cu. ft. gas.

Fear of Federal Curb Hikes California Permits

Los Angeles.—Notices of intention to drill new wells in California continued its record-breaking climb during the week, the 65 new locations having exceeded the total of the previous week by 11. Fear of federal restriction of some kind has prompted action on the part of several companies. A large percentage of the locations may not be drilled in the immediate future.

New wells reported this week include:

Crystall Gasoline Corporation's No. 3, Section 28-3-9; J. Orville Seeple's Seeple 4, and Seeple 5, Section 28-3-9, at Richfield.

Bartholomae Oil Corporation's Stern 1, Stern 2, Stern 3, and Stern 4, all on Section 22-3-10, at Coyote Hills.

Union Oil Company's Callender 31, Section 33-3-13; and Republic Petroleum Company's Republic-Childs 4, Section 34-3-13, at Dominguez.

Woolner Oil Corporation's L. B. Fee 7, Section 24-4-13; Davis Investment Company's No. 20 and No. 21, Section 29-4-12; Exeter Oil Company's Noll 3, Section 24-4-13; Noll 4, Section 18-4-12; Noll 5, Section 19-4-12; R. F. Oakes & E. E. Combs' No. 4, Section 29-4-12, at Long Beach.

Charles T. Lester's No. 1-A, Section 17-3-16, at Newhall.

Beloil Corporation's H. B. 2, Section 10-6-11; Sierra Huntington Oil Company's No. 2, Section 10-6-11; O'Dell Petroleum Corporation's No. 2 Section 10-6-11, at Huntington Beach.

Los Cerritos Petroleum Company's No. 1, Section 17-3-20, at South Mountain.

William A. Kirk's No. 5, Section 21-4-22, at Ojai.

Oak Ridge Oil Company's No. 1, Section 6-4-18; and No. 3, Section 6-4-19, at Piru.

Golconda Petroleum Corporation's Tognazzini 1; Tognazzini 3; Shaw 4, and Shaw 5, Section 9-8-32; Shaw 3, and Shaw 6, Section 9-8-32, at Cat Canyon.

R. H. McIntosh's Adams 1; Ballantyne 1, and McDaniels 1, Section 28-4-27; Frank Strehle's Strehle 1, Section 28-4-27, at Mesa.

Lincoln Petroleum Corporation's Alferitz 1, Section 10-25-18, at Devil's Den.

E. G. Starr's No. 1, Section 31-30-29; and No. 1, Section 25-30-28; The W. T. W. Petroleum Corporation's Mabry 1, Section 18-30-29; Shell Oil Company's Porter-Day 3; Porter-Day 4; Porter-Day 5; Porter-Day 6, all on Section 29-30-29; Cowan 1, Section 30-30-29; Bahrenburg 1; Porter Two 1, and Porter Two 2, on Section 32-30-29, at Mountain View.

L. L. White and Associates' NC 1, Section 6-30-28; D. A. Cushman's No. 1, Section 6-30-28; Kernco Oil Company's No. 2, Section 23-29-27, at Fruitvale.

Helm and Bailey's Coffee 2, Section 1-28-28, at Round Mountain.

Himovitz Oil Company's No. 2, Section 21-27-28; J. S. McCluskey's No. 1, Section 28-26-28; Ekoh Oil Company's Vedder 2, Section 28-26-28; Shell Oil Company's Vedder 7; Vedder 8, both on Section 9-27-28, and Security 7, Section 16-27-28, at Mt. Poso.

Frank Goldman and E. P. Hoisington's Grimes 3; Grimes 4; Grimes 5, and Grimes 6, all on Section 32-27-27, at Kern River.

Jim Baker's Hope 1, Section 10-31-28, in Kern County.

Lois E. Wilson's Wilson 1, Section 15-22-27, in Tulare County.

Irwin S. Burgess' No. 1, Section 12-28-7, in Tehama County.

Tehema Petroleum Corporation's Simpson 1, Section 10-22-5, in Glenn County.

Champion Oil and Transport Company's Iowa 1, Section 27-21-17, at Kettleman Hills.

Six Wells Drilling in Mountain View Field

Bakersfield, Calif.—Six wells are under way in the new Mountain View field, but the bulk of locations made during the past month will not be drilled in the immediate future. It is believed that most of these locations will never be drilled. Completion of three or four large flowing wells will prompt extensive drilling, but at least half of the operators are still wondering if the discovery well was not something of a freak. California is famous for entry of companies into new fields for protection, where they are not convinced as to the merits of the discovery. Major companies have been slow to rush into the Mountain View field, but smaller operators are willing to take a chance.

Mountain View is located in the bed of the San Joaquin Valley, and further emphasizes the importance of drilling away from the extreme fringes of the fill. The oil is 34 gravity and contains a high percentage of gasoline. The first well drilled in 1930 by Shell Oil Company produced about 1000 barrels of heavier oil, but the hole was lost upon deepening and plugging back in search of the original producing sand. The discovery well completed a few weeks ago flowed more than 3000 barrels daily.

Oklahoma City Cumulative Output 146 Million Barrels

Oklahoma City.—According to records of the state proration umpire cumulative recovery from the Oklahoma City pool, as of June 1, 1933, was 146,601,306 barrels divided by zones as follows: Wilcox sand, 71,632,789 barrels; Simpson-Below-Wilcox, 48,877,179 barrels; Arbuckle limestone, 10,509,102 barrels; Fault Line, 141,682 barrels, unclassified gas wells, 6,539,142 barrels; a total of 137,699,894 barrels. To this is added 256,097 barrels from wells abandoned and 8,645,315 barrels upon which tax was paid but which was not reported to the umpire as production and is therefore illegal oil.

Indian Territory Illuminating Oil Company was the leading producer with a recovery of 38,433,032 barrels from 333 wells or an average of 115,414 barrels per well; Phillips Petroleum Company was second on the list with a recovery of 16,299,823 barrels from 110 wells or an average of 148,180 barrels per well; and Slick Estate was third with a recovery of 14,635,318 barrels or an average of 119,962 barrels per well. Based on production reported to the umpire Oils Incorporated's Ross well leads in individual well recovery in the Wilcox sand zone with a cumulative production of 1,133,353 barrels; Wirt Franklin Petroleum Corporation's Lowery 2 has the largest recovery from the Simpson-Below-Wilcox with a total of 1,225,825 barrels; and Indian Territory Illuminating Oil Company's Mabel Fuzzell 1, leads in the Arbuckle limestone zone with a recovery of 1,223,786 barrels.

Oils Incorporated's Ross 1, in the closely drilled northwest quarter of Section 2-11n-3w, was completed October 6, 1930, for an initial flow of 13,200 barrels in 3½ hours from Wilcox sand at 6261 to 6550 feet. Calculated at this rate its 24-hour potential was 90,514 barrels, making it one of the largest high-gravity wells ever completed in the United States. On April 23, 1933, the well was gauged for new potential, producing 4,370.25 barrels in four hours and making gas at the 24-hour rate of 38,775,000 cubic feet. Compared on a 24-hour basis its potential decline after 30½ months of productive life was 64,292 barrels or 71 per cent.

Logan County Wildcat Comes In Making 375 Barrels Hour

Tulsa, July 14.—A search which involved the expenditure of many thousands of dollars in geologic and geophysic survey apparently was rewarded in a big way July 13 when Gypsy Oil Company and Carter Oil Company's McConnell 1, C NE SE Section 28-17n-4w, Logan County, came in flowing at an estimated 375 barrels an hour from sand, likely the Wilcox.

Operators had cored from 6131 to 6141 feet, finding top of a sand at 6120 feet. Bailing operations were commenced but gas started cutting through soon after the plug was drilled. The hole was bailed down approximately 1500 feet when gas broke through and the hole cleaned itself. On a thirty-minute flow it was estimated to be making between three and four hundred barrels of oil an hour and 17 million cubic feet of gas.

The fact that the well has a penetration of only about 20 feet but blew out approximately 4600 feet of heavy mud fluid indicates a high formation pressure and the possibility of a real gusher when the entire sand section has been drilled.

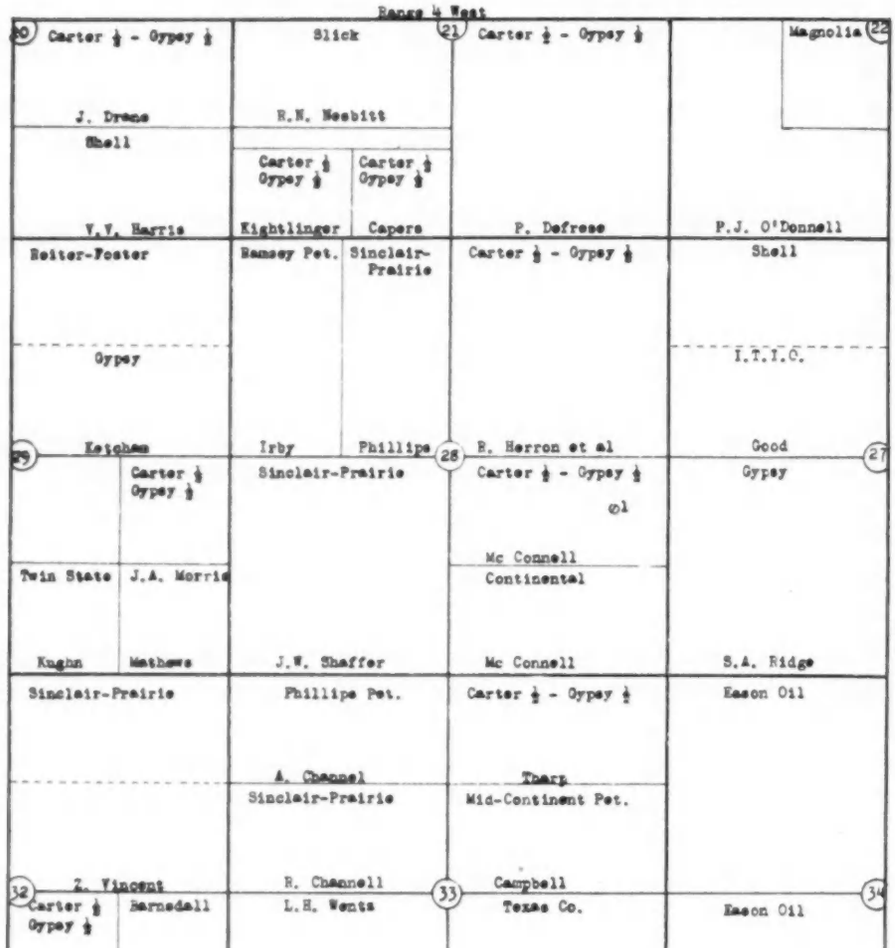
After the short flow it was shut in for erection of tankage. Further tests probably will be made Monday.

The new well is approximately six miles south of the Roxana pool and 32 miles northwest Oklahoma City. Nearest production is slightly over a mile to the south where Eason Oil Company's Young 1, SW NE SW Section 34-17n-4w, made 680 barrels initially from Layton sand at 4919 to 4942 feet in October, 1930.

The predominant structural feature through this portion of the state is the Nemaha mountains, a buried granity ridge extending from Kansas southward at least to central Oklahoma. Structures related to the ridge already have produced such fields as north and south Blackwell, Vernon, Otstot, Retta, Garber, Marshall, Roxana and Oklahoma City.

The McConnell test was located on the basis of extensive sub-surface geologic study augmented by geophysical check. Since the first marker was found it has been known to be running comparatively high. Compared with Ramsey Petroleum Corporation et al's Duck Club 1, NW NW NE Section 10-16n-4w, a dry hole at 6504 feet, McConnell 1 is 297 feet high on top of the Oswego limestone. Interval between top of the Oswego and top of the Hunton between these two wells diminishes to the north only 39 feet. While direct structual comparisons have not been made in other directions, the new well is said to be running very high.

Continental Oil Company has announced location for McConnell 1, C SE SE Section 28-17n-4w, south offset to the discovery well.



Showing location of Gypsy-Carter McConnell 1, Logan County, Oklahoma.

Growing Interest Noted in Western End of Oklahoma

Tulsa.—Due to considerably better geologic knowledge and relatively shallower depths the eastern half of Oklahoma continues to lead the state in wildcat activities. However, it has been of interest during the past few weeks to note the general pick up in activities in western counties where practically every test is the rankest kind of a wildcat. Little is known geologically about this portion of the state. Prior to the drilling of Mid-Kansas Oil & Gas Company and Ramsey Petroleum Corporation's Preston Culp 6, Section 6-5n-9w, it was thought that the Oklahoma City Pennsylvanian section might be encountered in the western and southwestern portions of the state. This test was drilled to 10,079 feet and thought to be in the Dornick Hills formation of Lower Pennsylvanian age when drilling stopped. It now seems that the Southern Oklahoma type section will be encountered throughout the Anadarko Basin and in the territory immediately surrounding it. Of the total of 37 tests on the active list, 13 are in western counties and 24 in eastern.

Acre et al's Acre 1, in Alfalfa County, CSW NE Section 14-24n-11w, was

still shut down for water at 5590 feet.

J. H. Lewis et al's Clark 1, in Garfield County, CNW NW Section 34-21n-6w, was rigging rotary tools.

First report was made of five new tests in Noble County, four in the Wentz area south of Perry and one, a wildcat location, Wentz, Feagan et al's Eyler 1, CSE SW Section 10-21n-2e, 2½ miles south of the town of Sumner, and 12 miles east of Perry. The other four tests are as follows: Continental Oil Company's Hafner 1, CNE NE SW Section 18-20n-2w, a location; The Texas Company's Maxwell 1, CNE NW Section 18-20n-2w, a location; Stanolind and Amerada's Frederick 1, CSW SE Section 28-20n-2w, location; and Stanolind and Amerada's D. L. Kolb 1, CNW NE Section 33-20n-2w, location.

In Payne County, Kemp-Nunnelee's Crane 1, SW SE SW Section 10-17n-6e, was drilling below 1225 feet.

Magnolia Petroleum Company was drilling below 2380 feet in Wagner 1, in Lincoln County, SW SE Section 2-14n-3e.

In Muskogee County, J. S. Routt et al's Escoe 1, CNL SE NE Section 17-13n-17e, was drilling below 600 feet.

Frank Russell, Inc.' Highley 1, in Oklahoma County, SW NW SE Section 23-12n-3w, set 15-inch to 291 feet and was drilling below 600 feet.

In Washita County, McWherter & Bost were drilling below 100 feet in Hale 1, SW SE SE Section 28-8n-19w.

In Seminole County, Spears Drilling Company et al's Hart 1, NW NE SW Section 18-8n-7e, ran tubing and packer, flowed 33 barrels of water per hour and shut down, Felmlee et al's Bowlegs 1, SE NE SW Section 1-7n-7e, was drilling below 510 feet. Stewart & Egan's Sanderson 1, NE NE SW Section 27-6n-5e, was rigging rotary. Armstrong et al's Diamond 1, NE SE SW Section 8-6n-7e, had brown lime at 2550 feet, Wapanucka at 2709 feet, cored 2850 to 2870 feet, getting a show of water, had Cromwell at 2868 feet and was drilling below 2880 feet.

In Kiowa County, King & Moose were drilling below 950 feet in King 1 SE SW NW SW Section 27-7n-20w.

In Hughes County, Gilcrease Oil Company's Thompson 1, NW SE Section 34-7n-8e, was drilling below 1161 feet.

In Caddo County, W. L. Miller's Gardner 1-A, SE SW Section 26-6n-10w, was shut in for tankage.

In Pontotoc County, Gilbert et al's Starritt 1, NW NW SE Section 28-4n-6e, was drilling below 1210 feet. Williams et al's Kroth 1, NE NE SE Section 33-3n-4e, had a hole full of water in sand at 1957 to 1977 feet. Sledge et al's Wooley 1, SW SE SW Section 22-2n-7e, was drilling out bad hole at 460 feet. H. L. Wirrick's Fee 1, SE SW Section 29-2n-7e, had water sands from 1898 to 2003 feet, and was drilling in shale at 2070 feet with a hole full of water. Choctaw Oil & Gas Company's Thompson 1, SW NE SW Section 1-1n-7e, had sand showing gas at 1215 to 1218 feet and was underreaming 10-inch.

Dodd & Burton's Grigsby 1-A, NW SE NE Section 35-1n-8e, was shot with five quarts at 1878 feet and filled 100 feet with oil, will test.

In Tillman County, Gypsy Oil Company's Co-Do-Pony 1, NWc Section 27-4s-15w, was drilling in sandy lime at 2647 feet.

In Atoka County, L. E. Stewart et al's Stewart 1, SE C NE Section 2-4s-10e, was drilling below 1825 feet. Malernee's Cole 1, NE NW Section 19-2s-14e, is a machine.

Believe Low Mark Reached In Oklahoma Field Work

Tulsa.—Results of the past week should be the worst that Oklahoma operators should experience in many months and perhaps in many years.

Reports show eight producing oil wells with a total initial production of 3046 barrels, and seven dry holes, making a total of 15 completions.

Outside of the Seminole district, initial production was only 622 barrels, 137 barrels of which came from two old wells drilled deeper.

Reports of the week were as follows:

Company, Well and Location	Init. Prod. Bbls.	Depth
Carter County—		
Ed Shell, Acres 1, SE NE SE 15-2s-2w	lcn.	abd.
Creek County—		
Dot Oil, J. Smith 34, CEL SE NW 8-18n-7e (owdd)	10	2509
Gled Oil, Escoe 2, NE SE SE 27-18n-8e	85	1333
Grady County—		
W. S. Critchlow, Adair 5, SWC NW 27-3n-5w	185	2569
Hughes County—		
Limestone O&G, Walker 7, NW NE NE 15-7n-8e	25	1231
Pawnee County—		
Fred Schell et al, E. Rea 1, SE C NE 18-20n-9e	*	3026
Payne County—		
Deep Rock Oil Corp., C. J. Harris 1, SE C NW 9-18n-5e (owdd)	127	3523
Pontotoc County—		
Delaney et al, Norris 1, SE NW NE 25-2n-6e	lcn	abd.
Pottawatomie County—		
Gypsy Oil, Gray 2, NWC SW 25-6n-4e	2052	3445
Spears, Greer 1, SE SW NE 20-7n-4e	*	96
Turman Oil, Polk 1, NW SE NE 4-8n-5e (formerly reported Southern Oil)	372	4029
Seminole County—		
Southern Oil, Carter 1, SWC 9-9n-6e	*	4273
Stephens County—		
Navajo O&G, Payne 1, SE SW NW 18-1n-5w	*	4821
George Pace, Gilworth "C" 3, SE NW NW 2-2s-8w	*	1929
M. X. Hobbs et al, Burnett 1, SE SW NE 32-5s-5w	*	2270
Tulsa County—		
Boyd, Daniels 2-A, NE SE NW 23-18n-14e	80	1362
Wagoner County—		
F. Jackson, Derisaw 1, CSL SW SE 24-18n-15e	*	1053

Company, Well and Location	Bbls.	Depth

Material Increase in New Work in Oklahoma

Tulsa.—New work in Oklahoma showed a material increase during the week when 30 first reports came from 15 counties This compares with 18 first reports for the preceding week.

Geographical division of new work of the past week shows 20 starts in eastern counties and 11 in western.

Okmulgee County led the list with five firsts; Pottawatomie, Oklahoma, and Hughes Counties had three each; Carter, Creek, Noble, Pontotoc, and Washita Counties had two each; and Jefferson, Murray, Osage, Seminole, Stephens, and Tulsa Counties had one each.

Indications of a break in a record spell of dry weather was looked upon as favorable to starting new work which has been contemplated for several months.

In Carter County, Samedam Oil Company announced location of M. Gorman 3, SW SE NE Section 25-1s-3w, and K. D. Oil Company was cementing surface pipe on J. Burton 5, NW SW NW Section 30-1s-2w.

In Creek County, Lovett et al's Whitehead 1, NWC NE Section 25-18n-8e, formerly reported Musketeer et al's No. 1, had machine on ground. J. E. Crosbie was rigging up machine on Escoe 6, NW SW SW Section 26-18n-8e. Galbreath and Byers also were rigging up machine on Allen 2, NW SW NW Section 35-18n-8e. Marble Oil Company was fishing at 748 feet on Wright 2, CWL NW SE Sec-

tion 7-19n-8e, which was formerly reported as Evans 2, SE NE SW.

In Hughes County, Limestone Oil & Gas Company had machine on Walker 8, SW SE NE Section 15-7n-8e. Baskin and Leeper were building rig on Coppedge 1, SE C Section 16-7n-8e. Phillips Petroleum Company had cellar dug on Jacobs 3, SW NE NE Section 16-7n-8e.

In Jefferson County, Southern Oil Company was building rig on W. D. Seay 8, SE NW SE Section 3-7s-5w.

In Murray County, Revels' Wolf 1, NE C Section 18-1n-2e, was cementing 15½-casing at 102 feet.

Two new tests in the Wentz area of Noble County were announced: Stanolind Oil & Gas Company's D. L. Kolb 1, CNW NE Section 33-20n-2w, a location; and Wentz, Feagin et al's Eyler 1, CSE SW Section 10-21n-2e, building rig.

Three wells were starting in Oklahoma County: Denver Producing & Refining's Frisco 1, SW SE NW SE Section 3-11n-3w, spudding, and Frisco 2, NW SE NW SE Section 3-11n-3w, a rig. Indian Territory Illuminating Oil Company's A. V. Wisel 2, CEL NE SW SE Section 26-11n-3w, was building rig.

Five first reports were listed for Okmulgee County. Clark et al's Strip 1, NE SE SW Section 26-12n-12e, spudding; McInturff's Porter 1-B, SE NE SE Section 4-12n-14e (triplet) drilling below 165 feet; Harmon Brothers No. 2 Jackson, NE C Section 9-12n-14e, machine; Colton and Phillips No. 1-A Huckaby, SE NE SW Section 30-14n-12e, machine; Bassett et al's Checote 1, SW SE SW Section 20-15n-13e, machine.

In Osage County, Sinclair Prairie Oil Company announced the location of No. 1, SW C NW Section 15-24n-7e.

In Pontotoc County, W. A. Delaney had machine on Busby 1-A, SW SE SE Section 20-5n-8e and announced Busby 2-A, SE SW SE Section 20-5n-8e.

Three first reports were listed for Pottawatomie County: Superior Oil's Horn 1, NE C NE Section 5-6n-4e, location; Hilton Phillips' Cherry 1, NE C SW Section 21-7n-4e, cellar; Lippa Drilling Company et al's Gaskill 1, SW SE NW Section 6-9n-5e, location.

In Seminole County, Anderson-Kerr were rigging up Anderson 1, SW NW NE Section 22-10n-7e.

In Stephens County, McAlester et al were drilling below 200 feet on Parker 1-A, SE NE SE Section 11-2s-8w.

In Tulsa County, H. Rothrock announced Billy 3, CNE SW Section 36-17n-14e.

Two first reports were listed for Washita County: Burns and Prince, moving in boilers on McDaniels 1, SWC Section 21-8n-18w, an old well deepening from 2162 feet, and McWhirter-Bose' Hale 1, SW SE SE Section 28-8n-19w, drilling below 100 feet.

Better Crude Prices Boost Kansas Drilling

Wichita, Kansas. — The effects of better crude oil prices were being felt in Kansas, the first tangible result being the increase of new work with 20 first reports during the past week compared to 11 starts during the preceding week.

The Hollow-Nikkel area of Harvey County sprung into a commanding lead with eight first reports, followed by Greenwood and McPherson Counties with four each and Rice County with three. Activity in Kansas has been far below normal for several months due largely to the low price paid for oil, and more recently to a drouth which forced many active tests to suspend operations and postponed the announcement of a large amount of intended new work.

Following is a list of new work indicated by first repots:

There were four first reports listed for Greenwood County: Hall et al's Vorhees 1-A, NE SW SE Section 1-22s-11e, a machine; Skelly Oil Company's Wick 23, SW NE NW Section 27-22s-11e, a location; Harwood Oil Company's No. 1 Olson, NW NE NE Section 11-25s-8e, rig; Wolf Creek Oil Company's Kolb 1, SE SE NE 15-25s-13e, machine.

Harvey County Leads List

Harvey County led the list with eight first reports, as follows: Lario Oil and Gas Company et al's Wall 1, NE SW SW Section 4-22s-3w, location;McComb et al, Dyck 1, SW NE SW Section 8-22s-3w, an old well rigging up to drill deeper from 3201 feet; McComb et al's Dyck 2, NW NE SW Section 8-22s-3w, location; Shell Petroleum Corporation's No. 3 Nikkel, SE SW SW Section 8-22s-3w, rig; Derby Oil Company's Schmidt 3, SE NW NW Section 17-22s-3w, building rig; Skelly Oil Company's Schmidt 3, SW NW NW Section 17-22s-3w, cellar; Sinclair Prairie Oil's Neufeldt 3-B, SE NE NE Section 18-22s-3w, building rig; Frost and others' Martens 4, NW SE SE Section 19-22s-3w, rig.

In Kingman County, D. R. Lauck et al announced the location of United Church 1, SE SW NE Section 10-28s-6w.

Three locations and one test spudding were announced in McPherson County. S. L. Clum et al were spudding on Nelson 2, a gas test, SW SE NW Section 12-18s-4w. Continental Oil's Tipton 1, NW SW NE Section 2-20s-3w, was a location, as were Dickey Oil's Gray 1, NWc SE Section 2-20s-3w, and Spencer et al's Neufeldt 3-B, SE SW SE Section 16-21s-3w.

In Rice County, Ramsey et al's Hedge 1, NE NE SE Section 31-19s-9w, was building rig. Ramsey et al's Linesvill 1, SE NE NE Section 31-19s-9w, was a location. Ramsey was spudding on City Park 1, NE NW SW Section 32-19s-9w.

Kingman County Again in Active List of Kansas

Wichita, Kansas. — Kingman County came back into the Kansas wildcat picture during the week when D. R. Lauck et al announced location for Church 1, SE SW NE Section 10-28s-6w, eight miles east and slightly south of the town of Kingman in the northeastern portion of the county. Nearest production is in Reno County, 20 miles to the northeast. The new test will be located almost on a straight line between Kingman and Murdock's Murdock 1, SE NE SW Section 3-28s-6w, a dry hole completed at 3440 feet on September 9, 1920, and Marland Oil Company's Pagett 1, NEc SW Section 11-28s-6w, also a dry hole completed at 4292 feet on January 22, 1927. Lauck is reported to have assembled a block of 5000 acres for the test. Only production in the county is in the Miles or Cunningham pool in 27s-10w.

In Sumner County, Deal Oil & Gas Company's Tompkins 1, SWc Section 26-33s-1e, was fishing at 3690 feet.

In Greenwood County, Charles Reser's Hull 1, NW SE Section 8-26s-9e, was fishing at 1955 feet.

In Butler County, Hartman Oil Company et al's McCann 1, SE SW NW Section 7-25s-3e, set 20-inch casing to 60 feet and was drilling below 253 feet. Marylyn Oil Company was drilling below 545 feet in Harsh 1, NE SW Section 33-23s-8e.

In Rice County, Vickers Petroleum Company et al's Specht 1, SE NE Section 20-20s-10w, had top of conglomerate at 3288 feet, set six-inch casing on top of siliceous lime at 3329 feet where it had a show of oil, total depth, waiting on cement.

In Barton County, Skelton et al's Ott 1, an old well drilling deeper, CSE SE Section 16-19s-14w, reran five-inch to 3580 feet and was cleaning out at 3607 feet. Helmerich & Payne et al's Eveleigh 1,

CSW SE Section 13-18s-13w, is a location. Ranken et al's Sooey 1, CSW NE Section 34-18s-12w, had a show of oil at 3485 to 3494 feet and was shut down at 3504 feet.

In McPherson County, Roth & Faurot's Swanson 1, NE SW NE Section 13-19s-3w, set eight-inch at 2947 feet, the total depth, and was shut down. Clum and others' Nelson 1, CSE NW Section 12-18s-4w, set eight-inch on top of Mississippi lime at 2961 feet, and had a hole full of water from 2984 to 2989 feet where it is shut down.

In Saline County, Lario Oil & Gas Company's Fulton 1, SW SW NW Section 14-16s-2w, had a hole full of water at 3335 feet, set six-inch at 3449 feet, had a hole full of water at 3460 feet and was drilling below 3475 feet.

Kansas Completions Continue To Be Few

Wichita, Kansas.—For the second week the number of Kansas completions was unusually small but the fact that again only one dry hole was included in the list is noteworthy. Six oil wells added 4488 barrels of new production, one test was spudded and abandoned while another was abandoned as a location.

The recent pick up in first reports in the state has not had time to be reflected in the number of completions which undoubtedly will show a nice increase in the next few weeks.

The following reports were made from seven counties:

Company, Well and Location	Init. Prod. Bbls.	Depth
Cowley County—		
Buck et al, Hilbert 1, swc nw 6-32s-5e	*	....
Ellsworth County—		
Gypsy-Stanolind, J. H. Stoltenberg 4, ne nw sw 22-16s-10w	1910	3356
Elk County—		
Hunt et al, Denton 1, nwc 10-31s-8e	19	2015
Greenwood County—		
Hollos Bros., Frankhouser 1, nwc se 23-22s-11e	*	1876
Harvey County—		
Skelly Oil, Smith 2, nwc 17-22-3w	1000	3567
Sinclair Prairie, Neufeldt 1-A, ne c se 18-22s-3w	515	3458
McPherson County—		
Palmer et al, Winn 2, sw se nw 7-20s-1w (owdd)	300	3418
Rice County—		
Ramsey et al, Ira 1, sw nw nw 32-19s-9w	744	3270
Sedgwick Conuty—		
Cavall et al, Kagey 1, sw ne sw 15-25s-1e	lcn.	abn.

*Failures; †Junked; ¶Million cu. ft. gas.

Lucey Company Reacquires East Texas Gathering Line

Longview, Tex.—Having repossessed an extensive pipe line system in the Longview-Gladewater section of the East Texas field that has been operated since early last March by Ty-Tex Pipe Line Company (Clint W. Murchison Interests) in gathering crude, Lucey Petroleum Company, Dallas, has resumed operating this converted water line under the name of Associated Pipe Line Company. Ralph E. Fair, vice-president Lucey Petroleum Company, is president of the new pipe line concern, and Bert Summers is vice-president.

The line consists of more than 80 miles of combination four and six-inch pipe, and was built during the early stages of development of the field to sell water to drilling rigs. Negotiations are under way for the Associated Pipe Line Company to deliver all oil gathered to a major buyer in the field.

Lone Star Gas Company Buys Freestone Acreage

Tyler, Texas. — Purchase contract has been given by Lone Star Gas Company to acquire the 4000-acre wildcat lease block near Thornton, Limestone County, bearing a shallow gasser and an incomplete deep test, from A. J. Riddle, V. V. Waite and C. H. Kadane for a consideration of $50,000, including a substantial payment payable from production. Lone Star Gas Company proposes to launch an active drilling campaign in the 775-foot gas zone, and also to deepen B. B. Barron 2 from its present depth of 4165 feet to below 4700 feet in order to test the Glen Rose formation. This deep test passed up a commercial gas flow in Woodbine section at 3049-3200 feet so as to comply with lease contract, but will probably plug back to try and revive the gas flow after required depth is attained.

Elimination of P. N. Wiggins, Tide Water Oil Company and Texas Seaboard Oil Company's southern Hopkins County wildcat test on the Scottish-American 48-acre tract, Nacogdoches University survey, was considered complete when salt water appeared in cores extracted from the Woodbine sand series at 4281 feet. Red beds were logged at 4370 feet, and late last week the hole was in lower sand at 4422 feet.

Henderson County is to receive another Woodbine sand test in the vicinity of Athens, where a half dozen tests have been drilled in recent years by independents below 4500 feet, with a few reputed to have encountered minor traces of gas. Wm. C. McGlothlin, Corsicana, and the American-Liberty Oil Company are to drill about three miles west of town on the H. English 950-acre tract, and in the southeast corner of Block 15, Juana Hendriquez survey. Their block consists of mare than 5000 acres.

East Texas Completions Include One Pumper

Tyler, Texas.—The East Texas field recorded 24 oil completions for the past week, as compared to 31 the previous week, only one of which was completed as a pumper, and it was an east side location in the Joiner area. Major companies contributed the bulk of the new wells, having 14 of the total.

Detailed list of completions in the East Texas field for the week follows:

Company, Well and Location	Init. Prod. Bbls.	Depth
Joiner Area—		
Cullen Oil Co., Thrash 2-B	2500	3724
Gulf Prod. Co., Mayfield (101-ac) 7-C	7000	3677
H. B. W. Oil Co., Redwine-Republic (63-ac) 2	1000	3607
Humble O&R Co., M. Kangerga (124-ac) 10-B	6000	3643
Mary Smith (83-ac) 2-B	1000	3670
Hunt Prod. Co., W. R. Fair (137-ac) 10-A	8500	3655
Sue Hale (91-ac) 6-B	500	3725
Lion Oil Ref. Co., H. Brooks (87½-ac) 10-B	3000	3740
Mid-Kansas O&G Co., S. H. Moores (193-ac) 13	1500	3732
Kilgore Area—		
Commodore Oil Co., Smith 1	4000	3610
Gulf Prod. Co., Grif Davis (50-ac) 7	9500	3580
Humble O&R Co., J. J. Pitner (65-ac) 7	9000	3755
Magnolia Pet. Co., Sam Carr (67.62-ac) 8	9000	3480
Laird-Crim (54.51-ac) 4	10,000	3588
Shell Pet. Corp., P. M. Bates (65-ac) 7	10,000	3608
B. F. Laird (54-ac) 4-B	9000	3597
W. P. Moore 12	9600	3705
Sun Oil Co., A. G. Morton (336-ac) 7	4000	3518
Longview Area—		
East Texas Oil Ref. Co., B. Doby-Rodden (42.85-ac) 5	8500	3726
Caddie Fisher (147-ac) 4	2500	3515
Gulf Prod. Co., M. O. Sheppard (335-ac) 25	8000	3506
Magnolia Pet. Co., O. F. Smith (97-ac) 9	5000	3641
Nash-Windfohr Oil Corp., C. Jones (30-ac) 4	12,000	3641
Townes et al, Lieck 1	2500	3680

*Failures; †Junked; ¶Million cu. ft. gas.

Proceed With Ector County Development

San Angelo, Texas.—Having assurance of a pipe line connection within a month, Stanolind Oil & Gas Company has authorized the drilling of one additional test on its two Cowden ranch leaseholds in Ector County, and a reasonable development program is to be continued thereafter in compliance with the demands of royalty owners.

The company's six-section solid block of leases bearing two flowing wells in the northern part of the county on the J. M. Cowden ranch is to be served with a pipe line connection by Humble Pipe Line Company. Two completed wells on the nearby Holt ranch are likewise to be given outlets. Stanolind Oil & Gas Company has made location for J. M. Cowden 3 to be 1980 feet from the north and east lines of section 34, block 43, T-1-N, T&P Ry. survey, or a short distance southwest of Cowden 2, which was completed flowing 450 barrels natural in lime at 4302 feet in April, 1931. Cowden 1, Section 26, Block 43, discovery well, was completed seven months earlier as a 350-barrel well at 4244 feet. These two wells have been flowing through small chokes into a 55,000 barrel tank since October, 1930.

In the Arcade, or Harrison-Addis pool, neas Odessa, Stanolind Oil & Gas Company has ordered Elliott F. Cowden 2 to be drilled 660 feet from the north and west lines of Section 26, Block 43, T-2-S, or nearly three quarters of a mile northwest of a 150-barrel producer owned by the company on the south line of the same section. The company holds lease on almost 10 solid sections of leases extending north from this producer, which has been shut in since completion last May in lime at 3816-4042 feet. It is reported that this well may be deepened in search of a more prolific oil zone in the lower section of the lime.

Progress on Humble Pipe Line Company's six-inch line, extending from the Judkins-Connell field, via the Arcade pool to the Cowden-Holt field in the northern portion of Ector County, has been delayed because of ranch owners holding out for an excessive right-of-way fee. However, the way was cleared last week when a condemnation suit resulted in the fee being placed at 50 cents per rod, instead of $1.50 demanded by land owners.

Clean out work on the two most recent additions to the Arcade pool was nearing completion last week. The Waggoner-Western Corporation, Fort Worth, was preparing to run tubing on Addis 1-A after knocking out bridge formed in hole after shot of 410 quarts in lime at 3865-3970 feet. F. E. McMullen, field superintendent, used a star machine to clean out the hole, and proposes to use acid to stimulate production if the well fails to register a good flow when tubed. This concern plans to start drilling a second test on its 120-acre lease, bordering L. C. Harrison et al's discovery well site on the south, within 60 days, while the latter will be required to offset this new producer. Fred Turner et al's Addis 1, a west offset to the discovery well site, has been pinched in pending arrival of a pipe line outlet, having gauged 70 barrels of oil on July 11, flowing through 5/64-inch choke from lime at 3902-4113 feet.

Harrison et al's discovery well on the Addis tract is the only one of the eight wells in the two Ector County pools that has been marketing oil as produced. These operators built a short four-inch line to a tank car rack at Arcade on the Texas & Pacific Railroad last December, and delivered to the Big Springs refinery of the Howard County Refining Company, which has been operated under lease by Harrison, V. E. Jackson et al. This lease on the plant was terminated July 1, but the plant owners will continue to buy the oil in tank cars.

A. W. Cherry et al's J. L. Johnson 1, SE Section 41, Block 43, T-1-S, was ordered plugged after encountering sulphur water in lime at 4455-60 feet, thereby eliminating a portion of the potential oil acreage lying between the two Ector County pools undergoing development. This failure was considered west of the normal trend for production, but showed a small quantity of live oil in lime at 4025-30 feet and at 4051-56 feet.

10 North Texas Pumpers Have 735-Barrel Initial

Wichita, Falls, Texas.—The North Texas district contributed 19 completions during the past week, including nine failures and 10 producers with a combined initial output of 735 barrels on pump. All were in the shallow sand and lime horizons.

Failure of Continental Oil Company's B. D. Ikard 1, to produce after drilling to 1100 feet furnished an unexpected setback for the southeastern Archer County pool opened up last April with a 40 barrel pumper by King & Krahenbuhl's A. J. Ikard 1 in sand at 993 feet. The failure is an east offset to the discovery well.

Completions in the North Texas district for the past week follow:

Company, Well and Location	Init. Prod. Bbls.	Depth
Archer County—		
Bonner Oil Co., M. B. Ray 3	130	1125
M. B. Ray 4	125	1126
Continental Oil Co., B. D. Ikard 1	*	1100
Fain-McGaha Oil Corp., Haytor 1	*	1480
Ben F. Jones et al, Andrews 1	10	878
White-Duncan & Stilley, Benson 1	*	924
Clay County—		
L. L. Bain et al, American Properties, Inc., 1	*	981
Jack County—		
Taylor & Willbanks, J. L. Starr 1	*	602
Wichita County—		
J. L. Swanner et al, Mrs. C. Parker 1	*	804
Schlaffke & Blair, Honaker 7	3	749
Schlaffke-Blair & Walton, Honaker 3	*	135
Wilbarger County—		
Waggoner Ref. Co., W. T. Waggoner 1-T	25	1291
Young County—		
Cable Oil Co., Snider 29	10	576
Kimmel et al, Earl Wheat 1	†	315
Panhandle Ref. Co., Morris 2, Sec. 252	7	576
Texas Plains Oil Co., Garvey 1	75	751
White-Duncan et al, Smith 2, Sec. 1365	*	739
White-Duncan & Beavers, Wolf 2, Sec. 247	200	698
D. L. Wolf et al, Fee 1, Sec. 297	150	685

*Failures; †Junked; ¶Million cu. ft. gas.

Proration Immunity Of Danciger Ended

Pampa, Texas.—Immunity from proration restrictions enjoyed by a few operating companies in the Texas Panhandle district since September 25, 1930, was officially terminated July 11 by the Texas Railroad Commission as a sequel to its federal court victory against Danciger Oil & Refining Company on July 7.

The latter concern had waged a continous battle in state and federal courts to resist the curbing of the output of its wells, which have been producing about 3300 barrels daily, as compared to a proration allowance of about 1000 barrels daily. Offset well owners have

been permitted to equalize drainage while the court contests were underway.

Danciger Oil & Refining Company has announced intention of carrying the suits against the commission to a higher court, but lacks approval of the court to produce its well at capacity during the appeal period, unless possibly an exhorbitant bond is posted.

Philtex Oil Company (Phillips Petroleum Company) and the Sinclair Prairie Oil Marketing Company abandoned their efforts to establish a top price of 73 cents per barrel for 40 gravity crude in Gray County and 63 cents for the best grade in other counties after abiding by same from July 6 to 11. They cut back 10 cents on each grade for lack of support of other buyers, although Magnolia Petroleum Company has a 69 cent top price for Gray County crude, and 59-cent top quotation on oil from Carson and Hutchinson Counties. Other important buyers—The Texas Company, Humble Oil & Refining Company and Danciger Oil & Refining Company—appear to be in no hurry to step up their price offers from the 46-cent level on Gray County oil.

The Panhandle district contributed five completions during the week, including three oil wells that accounted for a combined initial output of 300 barrels. The two dry holes for the period were from semi-wildcat tests in Gray County.

Company, Well and Location	Init. Prod. Bbls.	Depth
Gray County—		
Bell Oil & Gas Co., J. S. Morse 3	100	2542
Bob Dunlop et al, B. C. Priest 1	*	3125
Travis et al, Olle Crossman 1	*	3330
Hutchinson County—		
Badger Oil Co., Tom Lewis 5	140	2946
Sunny Jim Oil Co., H. W. Pitts 4	60	2938

*Failures; †Junked; ¶Million cu. ft. gas.

Crude Prices Help Work In West Central Texas

Ranger, Texas.—Evidence of an increase in volume of field activity in the West Central Texas district by independent operators as result of partial recovery of crude prices has put in its appearance. The district yielded 14 completions during the past week, including four oil wells with a combined initial output of 268 barrels. A small gasser in shallow sand in Callahan County was included in the list of completions.

Detailed list of completions in the West Central Texas district follows:

Company, Well and Location	Init. Prod. Bbls.	Depth
Brown County—		
F. B. Owen et al, R. Lynch 3	145	1269
The Texas Co., Lowe 88	3	1313
Callahan County—		
Holmes Oil Co., A. R. Kelton 1, Sec. 130	*	780
Putman Oil Co., Able 10	*	510
O. D. Small et al, Hinson 1	*	1810
Snebold et al, Finley 1	¶¼	1020
Spencer et al, Williams 2	*	821
Coleman County—		
Breck Oil Co., Goodman 1	*	1650
Eastland County—		
Jack Urban et al, Nunnelly 1	*	1352
Palo Pinto County—		
Nelson Oil Synd., Thomas 1	*	900
Shackelford County—		
A. C. Miller et al, Moberly 3	*	573
Roeser-Pendleton, Inc.-Humble O&R Co., Morris-Buie 4	100	1627
Star Drilling Co. Brewster 2-A	20	2120
A. C. Walker et al, J. H. Dillar 1	*	819

*Failures; †Junked; ¶Million cu. ft. gas.

West Texas Completes Seven Oil Producers

San Angelo, Texas.—Seven completions scored in the West Texas district during the past week accounted for an aggregate of 1495 barrels of new production. There were no dry holes in the group.

Completions in the West Texas district for the past week follow:

Company, Well and Location	Init. Prod. Bbls.	Depth
Howard County—		
M. D. Bryant et al, L. C. Denman 1	35	2865
Continental Oil Co.-Group 2 Oil Corp., Overton 5	500	2442
L. C. Harrison et al, Texas Land & Mortgage Co. 1	250	2882
Merrick & Lamb, Otis Chalk 7	270	1835
Sinclair Prairie Oil Co., G. M. Dodge 6	75	2805
Pecos County—		
J. H. McClure et al, Pecos Valley Oil Co., 1	35	1634
Winkler County—		
Colonial Oil Co., Scarborough-Amerada 1	330	2993

*Failures; †Junked; ¶Million cu. ft. gas.

Texas Permits Continue To Show Big Increase

Austin.—For the past fortnight there has been evidence of a material increase in the field work planned in Texas, as reflected in permits to drill wells.

Last week permits for 188 new wells were granted. This week permits for 157 new wells were granted.

This week's issuance brings the state's total of drilling permits for the year up to 3101, which compares with 4902 for the corresponding period of 1932.

Duval County, location of the Government Wells field, took the lead in South Texas; Harris County led the Gulf Coast sector in permits to drill, and East Texas new work largely fell to Gregg and Rusk Counties.

In Andrews County, Llano Oil Company, Fort Worth, was granted permit for J. E. Parker 1, (640-ac), 330 feet from the north and 990 feet from the east line of Section 18, Block A44, School Survey.

In Aransas County, Harry Traylor, San Antonio, was granted a permit to drill A. L. Dietzel 1, (30-ac), 150 feet from north and east lines of Lease 67, Block 4, J. F. Smith survey.

In Bastrop County, Humble Oil & Refining Company, Houston, was granted a permit to drill E. Wilhelm 6, (222-ac), 270 feet from west and 415 feet from north line of A. Mays survey. Chiquita Oil Company, San Antonio, was granted a permit to drill M. I. Harris 2, (40-ac), 300 feet northwest of No. 1, J. Maxmillian survey.

In Bell County, C. A. Montgomery, Denton, was granted a permit to drill Mrs. C. O. Reed 1, (75-ac), 150 feet from south and west lines of Griffin-Moreno survey.

In Bee County, B. Mauldin, Pettus, was granted a permit to drill J. L. Mauldin 3, (67ac), 425 feet north of No. 2, G. A. Kerr survey.

In Bexar County, H. A. Pagenkopf, San Antonio, was granted a permit to drill C. A. Goeth 1, (450-ac), 600 feet from southwest and 500 feet from southeast line of J. Montez survey.

In Brazoria County, Danciger Oil & Refining Company, Fort Worth, was granted a permit to drill W. S. Hunt 3, (1600-ac), 4207 feet from north and 1000 feet from east line of W. C. Carson survey.

In Brown County, Charter Oil Company, Brownwood, was granted a per-

mit to drill C. H. Reaves 1, (40-ac), 180 feet from west and 150 feet from south line of T. Belknap survey. F. N. May, Santa Anna, was granted a permit to drill J. C. Whidden 16, (124-ac), northeast corner of No. 52 W. M. Irion survey. Petroleum Interests, Inc., Brownwood, was granted a permit to drill T. S. Williams 1, (160-ac), 150 feet from north and 1050 feet from east line of J. R. Rushing survey.

In Caldwell County, Eddie Thomson, San Antonio, was granted a permit to drill E. Rodenberg 1, (250-ac), 150 feet southwest of center of northeast line of Jas. Berry survey.

In Callahan County, Anzac Oil Corporation, Coleman, was granted a permit to drill Johnson 1, (1040-ac), 2000 feet from east and 780 feet from north line of Section 146, GH&H survey. W. F. Snebold, Fort Worth, was granted a permit to drill J. R. Taylor 1, (120-ac), 450 feet from east and 150 feet from south line of Section 67, Bayland Asylum survey. C. B. Holmes, Baird, was granted a permit to drill A. R. Kelton 1, (68-ac), 1270 feet from north and 450 feet from east line of BBB&C survey.

In Carson County, American Refining Properties, Wichita Falls, was granted permits to drill Burnett 12, (160-ac), 1145 feet from east and 802 feet from south line SE¼ of Section 115, Block 5, I&GN survey; 11, 400 feet west of No. 1.

In Chambers County, Sinclair Prairie Oil Company, Fort Worth, was granted a permit to drill J. Wilburn 15, (52-ac), southwest corner of Wm. Hodge survey.

In Clay County, Hammond Oil Company, Fort Worth, was granted a permit to drill W. H. Myers 1, (1400-ac), 1650 feet from north and 330 feet from west line of C. Thompson survey.

In Concho County, Wahlenmaier Petroleum Corporation, Fort Worth, was granted a permit to drill W. T. Malloy 1, (80-ac), southwest corner of Section 16, C. Malloy survey. Mintex Oil Company, San Angelo, was granted a permit to drill Waring 2, (40-ac), 660 feet from north and 150 feet from east line of Section 2120, A. T. Robinson survey.

In Coleman County, Brek Oil Company, Fort Worth, was granted a permit to drill W. L. Edmondson 1, (34-ac), 150 feet from north and west lines of No. 166 D. J. Holt survey. Charles Welch, Albany, was granted a permit to drill J. W. Brown 1, (166-ac), 720 feet from north and 210 feet from east line of Block 10, HT&B survey.

In Duval County, Humble Oil & Refining Company, Houston, was granted a permit to drill C. W. Hahl 7, (320-ac), 2310 feet from south and 330 feet from west line of east ½ of Section 360 W. N. Seago survey. Navarro Oil Company, Houston, was granted a permit to drill C. W. Hahl 20, (320-ac), 990 feet from east and 1650 feet from south line of Section 360, W. N. Seago survey. Reynosa Oil Company, Wichita Falls, was granted permits to drill C. W. Hahl 8, (82-ac), 330 feet from south and east lines of Section 42; 7, 330 feet from north and east lines of section; Duval Ranch 1, (80-ac), 330 feet from north and west lines of Section 362, J. Poitevent survey. E. T. Harvey, Laredo, was granted a permit to drill E. C. Gallagher 1, (160-ac), 330 feet from north and west lines of Section 14, Block 8 of survey. Conway & Campbell, Laredo, were granted permit to drill W. K. Huffman 1, (240-ac), 330 feet from northwest and 1650 feet from northeast line of Section 114. C. J. Storey, Laredo, was granted a permit to drill J. A. Lundell 3, (80-ac), 1110 feet from north and 150 feet from east line of Section 48. R. F. Duggan, Laredo, was granted a permit to drill G. W. Sutherland 1, (80-ac), 1807 feet from east and 4186 feet from south line of Section 187. Sun Oil Company, Dallas, was granted permits to drill Cuellar 4, (164-ac), 411 feet southwest of No. 3, Section 576, BS&F survey; 5, 400 feet southwest of No. 4. L. W. Capps, Houston, was granted permits to drill Duval Ranch 4, (240-ac), east central part of lease, Section 576; 5, west central part of lease; 6, northeast corner; 7, northwest corner; 8, north central part of lease; Duval Ranch A 5, southwest corner of Section 574; 6, south central part of lease; 7, southeast corner; 8, north of No. 7; 9, southwest of No. 8; 10, northwest of No. 9; 11, northwest of No. 8; 12, northeast corner; 13, southwest of No. 12; 14, northwest corner; 15, west central part of lease; 16, northwest corner.

In Ector County, Broderick & Calvert, Fort Worth, were granted a permit to drill E. F. Cowden 1, (160-ac), 2640 feet from east and 440 feet from south line of Section 25, Block 44, T&P survey. (Amended location), Frank Gilpin, Jr., San Angelo, was granted a permit to drill B. H. Blakenley 1, (80-ac), 330 feet from south and east lines of Section 32, Block 43, T&P survey. Llano Oil Company, Fort Worth, was granted a permit to drill W. F. Bates 1, (320-ac), 330 feet from north and east lines of Section 38, Block 44, Twp. 1S.

In Fort Bend County, Wes-Len Petroleum Company, Houston, was granted a permit to drill C. R. Whittemore 3, (60-ac), southwest corner of S. Kennedy survey. Humble Oil & Refining Company, Houston, was granted a permit to drill Lockwood-Sharp B 15, (342-ac), 833 feet east of No. C1, Jno. Rabb survey.

In Gregg County, Roeser & Pendleton, Inc., Fort Worth, were granted a permit to drill Satterwhite A 7, (69-ac), 613 feet from east and 330 feet from south line of Sanchez survey. Canadian Oil Producing Company, Longview, was granted a permit to drill J. A. Whitaker 3, (7-ac), northeast corner of C. H. Alexander survey. Selby Oil & Gas Company, Tulsa, Oklahoma, was granted permits to drill Snavely C 9, (118-ac), 1905 feet from east and 330 feet from south line of J. R. Crosby survey; 8, 1117 feet from east and 330 feet from south line of survey; H. R. Snavely 6, (118-ac), 330 feet from north and 1124 feet from east line of J. R. Crosby survey; 7, 330 feet from north and 1919 feet from east line of survey. F. H. E. Oil Company, Ft. Worth, was granted a permit to drill B. C. Christian 10, (87-ac), 677 feet south of No. 7, G. W. Hooper survey. E. S. Holmans, Gladewater, was granted a permit to drill S. Turner 1, (1-ac), center of Block 60, M. Dillard survey. Rowan & Nichols Oil Company, Fort Worth, was granted permits to drill B. C. Todd B 3, (25-ac), 820 feet from east and 292 feet from south line of W. H. Castleberry survey; B. C. Todd A 4, (25-ac), 170 feet east of center of west line of W. H. Castleberry survey. Reserve Petroleum Company, Tulsa, Oklahoma, was granted a permit to drill A. Godfrey 3, (10-ac), center of M. Van Winkle survey. The Texas Company, Shreveport, La., was granted a permit to drill J. M. Dickens 6, (88-ac), 666 feet north of No. 3, Wm. McCurry survey. Stanolind Oil & Gas Company, Fort Worth, was granted permits to drill B. Jones 3, (30-ac), 369 feet north of No. 1, G. W. Hooper survey; 4, 369 feet North of No. 2. Magnolia Petroleum Company, Dallas, was granted a permit to drill O. F. Smith 10, (92-ac), 660 feet east of No. 9, H. H. Edwards survey. Atlantic Oil Producing Company, Dallas, was granted permits to drill W. T. Burnside B 19, (214-ac), 760 feet north of No. 2, Johnson survey; W. P. Duncan 14, (155-ac), 660 feet north of No. 13, Ferguson survey; J. M. Moore 42, (447-ac), 660 feet west of No. 40, Johnson survey. Gulf Production Company, Houston, was granted permits to drill S. Hilburn E 53, (269-ac) 191 feet from north and 83 feet from east line of Jno. Wilkinson survey; J. S. Elder 3, (35-ac), southwest corner of Jno. Wilkinson survey.

In Gray County, Danciger Oil & Refining Company, Fort Worth, was granted a permit to drill G. N. Powell 10, (160-ac), 990 feet from south and

east lines of NW¼ of Section 28, Block B2, H&GN survey; Wright 3, (160-ac), 330 feet from west and 990 feet from south line NE¼ of Section 13, Block 3, I&GN survey. British American Oil Production Company, Tulsa, Oklahoma, was granted a permit to drill H. Phillips 3, (160-ac), southwest corner of Section 127, Block 3, I&GN survey.

In Guadalupe County, W. J. Walton, San Antonio, was granted a permit to drill M. Hoffman 1, (32-ac), 750 feet from east and 150 feet from south line of No. 11, G. DeWitt survey.

In Harris County, Hamill Drilling Company, Inc., Houston, was granted a permit to drill C. W. Walker 1, (38--ac), 250 feet from east and 660 feet from north line of Charles Sage survey. Melbah Oil Company, Houston, was granted a permit to drill House 1, (280-ac), 165 feet from north and 600 feet from east line of Section 22, Harris C.S.L. survey. Continental Oil Company, Fort Worth, was granted a permit to drill T. Petrich 1, (50-ac), 3663 feet from south and 164 feet from west line of Jos. House survey. Huffman Dome Development Company, Houston, was granted a permit to drill E. M. House 1, (3000-ac), 948 feet north of center of south line of M. Magruder survey. E. V. Parsons, Houston, was granted a permit to drill J. M. Freeman 1, (640-ac), 500 feet from south and 330 feet from east line of Section 57, Block 2, H&TC survey. Humble Oil & Refining Company, Houston, was granted permits to drill A. Doege 1, (90-ac), 1399 feet from south and 1013 feet from east line of A. Goodrich survey; E. Schultz 1, (123-ac), 1107 feet from south and 900 feet from west line of C. Goodrich survey.

In Hardin County, Arlis Petroleum Company, Beaumont, was granted a permit to drill Sour Lake Bank 1, (80-ac), northwest corner of Section 69, Block 11, HT&B survey.

In Henderson County, McElreath & Suggett Oil Corporation, Fort Worth, was granted a permit to drill Fee 1N, (32-ac), 300 feet from west and 900 feet from south line of W. P. Wyche survey. Wm. C. McGlothlin, Corsicana, was granted a permit to drill H. English 1, (950-ac), 300 feet from south and east lines of Block 15, J. Hendriquez survey.

In Howard County, Continental Oil Company, Fort Worth, was granted a permit to drill Settles A 11, (28-ac), 2092 feet from west and 371 feet from south line of Section 6, Block 32, T&P survey.

In Jack County, Luther Hedrick et al, Wichita Falls, was granted a permit to drill R. L. Voyles 1, (367-ac), 750 feet from north and 1500 feet from east line of BBB&C survey.

In Jim Hogg County, Clark, Cowden & Cole Petroleum Company, Laredo, was granted a permit to drill J. V. Pena 1, (10-ac), center No. 588, Share 2.

In Jones County, Moutray & Bryan, Abilene, were granted a permit to drill N. Ray 1, (80-ac), 1100 feet from west and 660 feet from south line of Section 259, B. M. Clopton survey.

In Karnes County, Karnes County Development Company, was granted a permit to drill C. Salge 1, (221-ac), 150 feet east of center of west line of Wm. Pate survey.

In Live Oak County, Sheldon & Snider, San Antonio, were granted a permit to drill E. Terrell 1, (160-ac), 1000 feet from south and east lines of E. Jurdin survey. J. H. Durbin, San Antonio, was granted a permit to drill P. J. Marbach 2, (429-ac), 1000 feet from south and 3200 feet from west line of S. Hays survey.

In Loving County, Crawford Oil Company, Fort Worth, was granted a permit to drill J. S. Crawford 1, (40-ac), center of SE¼ SE¼ of Section 38, Block 76, T&P survey.

In McMullen County, Whisenant & Trenchard, Laredo, were granted a permit to drill Martin 1, (4800-ac), 990 feet from northeast and 330 feet from southeast line of Section 138. J. V. Edwards, San Antonio, was granted a permit to drill J. T. Brown 1, (160-ac), 150 feet from north and west lines of J. T. Brown survey.

In Matagorda County, Continental Oil Company, Fort Worth, was granted a permit to drill W. H. Boker 1, (739-ac), 400 feet from south and west lines of Lot 17, J. Y. Criswell survey.

In Maverick County, Wright & Stroman, Eagle Pass, were granted a permit to drill Debona 1, southeast corner of No. 1 survey.

In Montgomery County, West Production Company, Houston, was granted a permit to drill Foster Lbr. 1, (806-ac), 467 feet from north and 650 feet from west line of Section 3, T&NO survey. Tide Water Oil Company, Houston, was granted permits to drill P. G. Krohn 2, (162-ac), 467 feet from west and 1330 feet from south line of S. H. Bryan survey; C. M. Dean 12, (274-ac), 330 feet from north and west lines of W. C. C. Lynch survey; 13, 933 feet north of No. 6; J. W. Lewis A 24, (489-ac), 1400 feet from west and 1345 feet from north line of C. B. Stewart survey.

In Montague County, Bridwell Oil Company, Wichita Falls, was granted a permit to drill C. R. Tucker 4, (69-ac), 575 feet from north and 250 feet from east line of Geo. Nichols survey.

In Navarro County, W. M. Young, Corsicana, was granted a permit to drill H. H. Tucker 2, (68-ac), 450 feet east of No. 1, J. Peoples survey.

In Polk County, Percy Davis, Dallas, was granted permits to drill G. W. Davis 4, (160-ac), 300 feet from south and west lines of J. J. Dollard survey; 3, 300 feet from north and west lines of survey; 2, 300 feet from south and east lines of survey; 1, 300 feet from north and east lines of survey.

In Rusk County, J. M. Roberts, Henderson, was granted a permit to drill W. P. Brightwell 1, (1½-ac), center of R. E. Winn survey. East Shore Oil Company, Henderson, was granted a permit to drill T. Fox 5, (40-ac), 660 feet south of No. 1, A. Cormack survey. Blackwell Oil & Gas Company, Kilgore, was granted a permit to drill S. Stone 8, (53-ac), 198 feet from west and 251 feet from south line of M. J. Pru survey. Houston Oil Company, Houston, was granted a permit to drill S. S. Laird 6, (70-ac), 800 feet northeast of No. 4, I. Ruddle survey. G. O. Kelly, Mt. Pleasant, was granted a permit to drill C. B. Hannah 2, (11-ac), 198 feet from east and 157 feet from south line of J. B. Cadena survey. Combined Oil Interests, Fort Worth, were granted a permit to drill G. W. Eaton 16, (125-ac), 660 feet south of No. 5, F. Cordova survey. Marr Drilling Company, Tyler, was granted permits to drill T. Lacy 2, (50-ac), 330 feet from north and east lines of J. H. Sparks survey; 3, 330 feet from south and east lines of survey; 4, 624 feet west of No. 3; M. Lee 1, (44-ac), 330 feet from south and east lines of J. H. Sparks survey; 2, 330 feet from south and west lines of survey; 3, 330 feet from north and east lines of survey; 4, 330 feet from north and west lines of survey. Sun Oil Company, Dallas, was granted a permit to drill J. R. Beall 11, (180-ac), 621 feet southwest of No. 6, Wm. Chism survey. Tide Water Oil Company, Houston, was granted permits to drill H. P. Leverett 7, (109-ac), 330 feet from south and 860 feet from east line of W. W. Simms survey; 6, 330 feet from south and 1650 feet from east line of survey. Mid-Kansas Oil & Gas Company, Shreveport, La., was granted a permit to drill R. Van Zandt 2, (98-ac), 330 feet from south and east lines of J. H. Sparks survey.

In Refugio County, Blanco Oil Company, San Antonio, was granted a permit to drill J. J. O'Brien 2, (107-ac), 600 feet southwest of No. 1, N. S. Crunck survey. Nesral Production Company, Houston, was granted a permit to drill T. H. Heard 1, (34-ac),

northwest corner of E. H. Winfield survey. Circle W Oil Company, Houston, was granted a permit to drill J. M. O'Brien 1, (212-ac), 466 feet from east and 463 feet from south line of E. H. Winfield survey. Humble Oil & Refining Company, Houston, was granted a permit to drill M. V. O'Connor 7, (5626-ac), 12,782 feet from south and 1852 feet from south line of F. Rios survey. Alamo Petroleum Company, Houston, was granted a permit to drill I. M. O'Brien 2, (50-ac), 536 feet from north and 507 feet from east line of E. H. Winfield survey.

In Shackleford County, Union Oil & Mining Company, Abilene, was granted permits to drill W. A. Carter 2, 1882 feet from west and 1618 feet from south line of Section 70, LAL survey; 3, 1882 feet from west and 2218 feet from south line.

In Smith County, W. B. Hamilton, Wichita Falls, was granted a permit to drill L. A. Gambrell 6, (54-ac), 330 feet from north and west lines of R. McAnulty survey. The Texas Company, Shreveport, La., was granted permits to drill M. Blackwell 10, (100-ac), 680 feet north of No. 3, Jas. Jordan survey; 9, 710 feet south of No. 2.

In Taylor County, H. Crisman, Abilene, was granted a permit to drill Abilene 1, (160-ac), 1300 feet from north and 1200 feet from east line of Section 66, Bayland Asylum survey.

In Tyler County, Texas Crude Oil Corporation, Beaumont, was granted a permit to drill Caswell 1, (160-ac), 300 feet from north and 700 feet from east line of Ben Enloe Survey No. 3.

In Upshur County, C. H. Lyons, Shreveport, La., was granted a permit to drill S. Smith 1, (200-ac), 330 feet from north and west lines of J. Holbert survey.

In Wichita County, George Proctor, Wichita Falls, was granted a permit to drill W. B. Honaker 13, (66-ac), 1170 feet from north and 150 feet from east line of Block 1, C&M survey. G. W. Cooper, Wichita Falls, was granted a permit to drill G. R. Hodge 1, (42-ac), 150 feet from north and west lines of Block 38, WVFL survey.

In Ward County, Gulf Production Company, Fort Worth, was granted permits to drill Hutchings 20, (370-ac), 330 feet from south and west lines of Section 5, Block F, G&MMB&A survey; G. W. O'Brien 34, (640-ac), 330 fet from south and east lines of Section 16, Block F, G&MMB&A survey.

In Webb County, Remo Royalty Company, Laredo, was granted a permit to drill G. Villareal 1, (40-ac), 150 feet from north and west lines of Section 1100.

In Wharton County, Smith & McDannald, Electra, were granted a permit to drill J. P. Ridgeway 1, (205-ac), 2018 feet from onrth and 637 feet from east line of Section 8, G. C. Gifford survey.

In Wilbarger County, J. L. May, Ft. Worth, was granted a permit to drill W. T. Waggoner 1, (320-ac), southwest corner of SW¼ SE¼ of Section 51, Block 14, H&TC survey. Waggoner Refining Company, Electra, was granted permits to drill W. T. Waggoner T 2, (120-ac), 300 feet southwest of No. 1, Section 48, Block 4, H&TC survey; 3, 300 feet southeast of No. 1; 4, 300 feet northwest of No. 1, Section 57.

In Willacy County, W. W. Silk, Wichita Falls, was granted a permit to drill Santa Rosa 1, (40-ac), 600 feet from east and 200 feet from south line of Lot 16, Block 30 of survey.

In Wise County, West & Kelley, Wichita Falls, were granted a permit to drill N. A. Whitley 1, (140-ac), 800 feet from north and 1300 feet from west line of Section 19, DCSL survey. Danciger Oil & Refining Company, Ft. Worth, was granted a permit to drill J. D. Manning 1, (627-ac), 660 feet from north and west lines of James Tarlton survey.

In Young County, Pitzer & West, Breckenridge, were granted a permit to drill W. W. Williamson 2A, (160-ac), 1375 feet from east and 250 feet from north line of 458, TE&L survey.

Greta Activity Indicated By Trades, Line Building

San Antonio, Texas.—Further outlet for Greta field's production through the construction of pipe line and storage facilities, trade of considerable proven and semi-wildcat acreage and testing of outpost wells centered much interest around this new Refugio County district during the week.

Atlantic Pipe Line Company officially announced plans for the immediate construction of a six and eight-inch extension of its pipe line at Refugio to the new field, a distance of about nine miles. This line extends to Port Aransas, where the company has a tank farm and deep water loading terminal.

The field's production already is well above 3000 barrels a day from the three wells, and more operations are underway.

The Texas Company likewise is coming into the field as a purchaser, and it may be expected that the same will apply to the Humble Oil & Refining Company in the near future. The crude from the Buckner well is reported to be going to W. F. Morgan, and finally to The Texas Company at Corpus Christi. The oil from the other two wells is being bought by George Eggleston of Corpus Christi. All of the crude is handled by tank cars. The Texas Company is building a 5000-barrel tank on the Morgan 107-acre tract on the east side of the railroad, from which point a line is being laid to Luling Oil & Gas Company's lease, where a well is now being drilled.

Humble Pipe Line Company has large storage facilities at Inglesides on the coast and has a line into the Refugio field. This would bring this deep water outlet to within nine miles of the Greta field.

Gauges on the three producers late in the week showed Greta Oil Company's well to be making better than 1000 barrels a day, more than double its initial output. The Buckner well is flowing 1490 barrels and the Simmons & Means test is flowing 720 barrels, all through small chokes. These flows represent an increase over initials.

The well holding the most interest at this time is Atkins and O'Neill's J. F. Welder 1, making a drill stem test at 4412 feet. The tester seat is at 4348 feet. This well is in the southeast corner of the 300-acre tract in the James McGrew survey and is 14,000 feet northeast of the discovery well. Its showing will have important bearing on the future of the field.

Five thousand feet farther northeast, Vidauri Oil Company is swabbing at 3522 feet in J. F. Welder 1, northeast corner of the tract and in the James McGrew survey, at the town of Vidauri. The well has swabbed down 1600 feet and was showing oil and salt water. Its ultimate outcome likely will be deepening to the regular sand. The wells in the lower field found this sand, but tested oil, gas and salt water and were carried deeper.

Some important lease deals have been made or are in process. Continental Oil Company recently purchased 200 acres between the two wells mentioned above, and is reported to have taken 300 acres out of the James Powers 640-acre tract, it being located east of the railroad. The Texas Company is getting in around the testing

well, the block consisting of 1000 acres out of the Welder ranch and being 300 acres on the east side of the railroad and 700 acres on the west side of the railroad. A good sized cash consideration was reported.

Atlantic Oil Producing Company is a heavy interest-holder in the field, its acreage and interests being acquired since the newest wells showed production. The company purchased 200 acres outright through a deal between it, George E. Smith and Mrs. O. H. Provines. The company has an option on one half interest in 800 acres more, becoming interested through financing of wells in the area.

Humble Oil & Refining Company was reported to have reached the final stages in a deal for the Heard Estate tract of 922 acres to the south of the Atkins & O'Neill well and near the new production.

Wilson County Joint Test Plans Going to 6,000 Feet

San Antonio, Texas.—Humble Oil & Refining Company's operation in Wilson County, encountered approximately 100 feet of serpentine, the horizon starting at 4812 feet. It is now drilling at 4993 feet, headed to the Edwards lime, possibly 6000 feet deep.

The well is B. B. Hardy 1, Joseph Reynolds Survey, between Floresville and Stockdale. Participating are Humble Oil & Refining Company, Amerada Petroleum Corporation, Sun Oil Company and Gulf Production Company.

The well topped the Austin Chalk at 4775 feet, the serpentine at 4812 feet. At 4835-42 feet, a drill stem test revealed four fourbles of salty mud and a show of oil and gas in fifteen minutes. Another drill stem test was made in broken chalk at 4913-59 feet, which developed 250 pounds in six minutes.

Kerr County Test Plans Going to Ordovician Lime

San Antonio, Texas.—An Ordivician lime test has been announced for the Love ranch district of Kerr County, L. L. Evans et al's Jeff Love 1, Section 1923, classed as the discovery well of the district. It was drilled a couple of years ago to 3391 feet, where it made a small producer, but was deepened to 4060 feet, and developed salt water. It will be worked over in attempt to produce at 3391 feet, and carried to the Ordivician, likely just above 6000 feet.

Eastland Oil Company's Jeff Love 1-D, has been abandoned at 3508 feet, and W. E. Clark is rigging up on his Jeff Love 1. The first is in Section 1594 and the latter is in Section 1759.

North Government Wells Producer Opens Territory

San Antonio, Tex.—Smith & Storey's Lundell 3, located 3200 feet southwest of North Government Wells production and just northeast of the original field, is a large producer from 2292 feet. It apparently connects the two fields, and opens considerable territory for immediate drilling.

The well offsets Magnolia Petroleum Company acreage on the west and is just north of several tracts involved in deals which will bring about drilling immediately.

Storage is being erected and a separator installed, after which the well will be put on production. Its first flow into the slush pits indicated probably 800 to 1000 barrels with a large volume of gas, and showing 800 pounds pressure. The well had sandy shale from 2273-84 feet, a little rock, and sand from 2284-92 feet, the total depth.

Shallow Gas Production in North Zapata County

San Antonio, Texas.—A shallow gas field was opened in northern Zapata County by Arthur H. Wray's Gopher Trust Estate 1, in the Fullerton subdivision of Share 8, Borrego Grant. The well made a flow estimated at 5,000,000 cubic feet, and registered a rock pressure of 150 pounds from 348-70 feet.

Tuleta Extension Well in Third Producing Horizon

San Antonio, Texas.—Tuleta field, Bee County, was extended and a new sand discovered when V. I. Grisham's J. M. Rapp 1-B showed for a good producer on drill stem test from 4393 feet. This is the third producing horizon for the field, and the second in the zone commonly referred to as Yegua.

The well, located one mile south of Tuleta and near the highway, showed salt water in the Pettus sand and the Yegua sand, both producers in the field proper. It was carried deeper, topping a new horizon at 4387 feet, 100 feet lower than the deepest sand in the field. It showed five feet of sand to 4392 feet, where the bit went into shale.

Drill stem test was made July 12, on which a gas pressure of 400 pounds was developed in six minutes, at which time the well started spraying oil. In ten minutes, the pressure increased to 450 pounds and the spray of oil materially increased. The test tool was then closed, but the heavy gas pressure cut the valve, the flow increasing to around 750 pounds and the flow of oil showing rather heavily.

The field was discovered in July, 1932, by C. F. Nichols' J. P. Harris 1, showing 250 barrels initial from 4087-98 feet. The Yegua sand was opened in November of the same year by Dirke Brothers' Fee 1, which topped the sand at 4276 feet, drilled to 4302 feet, plugged to 4296 feet, and flowed about 375 barrels initial.

The Grisham well is located 150 feet from the west line and 450 feet from the south line of the 20-acre tract in Section 12, C. Miller survey.

4484 Barrels Flush Oil Added in South Texas

San Antonio, Texas.—South Texas added 4484 barrels new oil production and fifteen million cubic feet of gas during the week. The completions follow:

Company, Well and Location	Init. Prod. Bbls.	Depth
Atascosa County—		
August M. Blume, W. T. Shaw 1, No. 275 Farquhar survey	*	1628
Bastrop County—		
Humble O&R Co., Wilhelm 5, S. Wolfenberger sur...	400	2544
Duval County—		
DeLange & Snider, R. Sanchez 1, Block 35, Sec. 197	*	3800
Humble O&R Co., C. W. Hahl 6, Sec. 360	1704	2320
Navarro Oil Co., C. W. Hahl 7, Sec. 360, dd	*	2422
C. W. Hahl 13, Sec. 360..	75	2289
Smith & Storey, Lundell 3, Sec. 48	800	2292
Shasta Oil Co., W. R. Peters 1-D, Sec. 38, pb 2460	15	2365
Southwest Drlg. Co., R. Wendt 10, Sec. 43	1440	2290
Windsor Oil Co., W. R. Peters 1, Sec. 33	¶10	2234
Kerr County—		
Eastland Oil Co., Jeff Love 1-D, Sec. 1594	*	3508
Starr County—		
Hooks & Weaver, Kelsey Bass 15, Sec. 6, Por. 75-6-7	*	2268
Webb County—		
E. H. Morris, S. Benavides 1, Block 318, M. E. Hale sub.	*	....
Reno Royalty Co., A. Villareal 1, Sec. 1100	*	2295
South Texas Oil Co. & Max Pray, Laurel 1, Sec. 270 Block 5	*	2364
Zapata County—		
The Texas Co., Jennings 30, C. Blanco Grant	50	1196
Arthur H. Wray, Gopher Trust Estate 1, Share 8, Borrego Grant	¶5	370

*Failures; †Junked; ¶Million cu. ft. gas.

Colorado County Wildcat Records Gas Showings

Houston.—Weimar Development Company's H. T. Brandt 1, Colorado County wildcat which caused considerable speculation last week when it tested fresh water at 4038-48 feet, has been showing small traces of gas since that depth to the drilling depth of 4635 feet reached July 14.

Brandt 1, located four miles north of Borden and northeast of the town of Weimar, centers about 30,000 acres of the development company holdings. It will be drilled to 5000 feet.

Thompsons Field Extended 1200 Feet to Northeast

Houston.—Gulf Production Company effected a 1200-foot northeasterly extension of Thompsons field in Fort Bend County this week when Hammerstream 2 was completed at 5424 feet for an initial production gauged at 34 barrels per hour through a three eighths inch choke.

Hammerstream 2, which had a tubing pressure of 325 pounds, produced 25.3 gravity oil. Seven-inch casing was landed at 5289 feet and 86 feet of screen was run.

Tomball Townsite Gets Well Spacing Order

Austin, Texas.—In order to prevent fire hazards in the Tomball Townsite in the Tomball-Hufsmith area, the Texas Railroad Commission has issued a special order on the spacing rule for that portion of the field which may be developed within the town, requiring the spacing of wells 466 feet from lease lines and 933 feet apart.

"The commission will not grant an exception to any applicant, regardless of when his property was acquired, unless he is able to meet the requirements of the above spacing rule in a substantial way," the order reads.

"The commission likewise announces its intention of refusing to grant a permit to locate and drill a well within less than a distance of 933 feet to any other drilling or completed well in the Tomball Townsite, or subdivided acres adjacent thereto, on account of the hazards (fire).

"Owners of small tracts in said producing area whose tracts are too small to conform to the spacing requirements of this order may, if they desire, make a joint application for a drilling permit with the owner or owners of other small tracts so that the combined tracts of all such applicants will conform to the spacing requirements of the rule."

In commenting on the new order, members of the commission indicated that they do not contemplate permitting the drilling of a well on one townsite block, but will make every effort to require spacing of the wells the same distance apart as required in the main body of the field.

Danciger Is Deepening Second Well at Pledger

Houston.—Disappointed with production performance of its second well at Pledger, discovered in 1932 by Danciger Oil Refining Company, a decision has been made by this operator to deepen the well, Hunt 2.

Hunt 2, reported July 14 drilling at 7410 feet in sandy shale, was completed in June at 6886 feet for five barrels of distillate and about 20 million cubic feet of gas.

Hunt 1, the discovery well, was completed at 6782 feet for an initial production of 28 barrels of high gravity distillate and about seven million cubic feet of gas. It is located 185 feet east and 1050 feet north of Hunt 2. Location has been made for Hunt 3, 4207 feet from the north and 1600 feet from the east line of the 2594-acre tract in the W. C. Carson Survey.

Panola County Wildcat Flows 15 Barrels of Oil

Marshall, Tex.—Mid-Continent Drilling Company's T. J. Wooten 1, P. Martin Survey, wildcat in Panola County, eight miles from Carthage, was officially completed last week flowing 15 barrels of oil daily through two-inch tubing. Total depth is 2073 feet. The oil is coming from the Blossom sand and tested 46.8 gravity, corrected. Several wells in this area previously have shown oil in small quantities at this horizon.

Already three new locations have been made in vicinity as a result of the commercial well. They are: W. H. Nichol's Spence Ray 1, W. M. B. Culver Survey, derrick; C. A. Reimer's H. B. Ivey 1, H. B. Ivey 86-acre tract, P. Martin Survey; location; M. H. Robin's Alzee Williams 1, Alzee Williams 30 acres, Winny Mann Survey, materials.

In Marion County, 1½ miles due north of Atlanta, Broderick & Calvert are arranging to make a 4000-foot test on a supposed fault recently discovered.

In Marion County southwest of the town of Jefferson, Solar Exploration Company has taken an option on 5000 acres centering in the Alexander Johnson Survey which it plans to explore with a series of core holes. It agrees to pay $1 per acre for what leases from the block are taken.

TOMBALL DRILLING PROGRESS

Houston.—Active tests in Tomball area July 14 were progressing as follows:

Humble Oil & Refining Company's Doege 1, C. Goodrich Survey, moving in rig; Humble's Mrs. F. Martens 1, William Hurd Survey, depth 5586 feet, set 43 feet seven-inches of five-inch screen, nine feet of blank on bottom, estimated initial production three million cubic feet of gas and 1½ barrels per hour of mud, water and oil emulsion through quarter inch choke; Humble's Herbert Reid 1, C. Goodrich Survey, drilling in shale and lime at 1296 feet, 10¾-inch casing set at 1137 feet; Humble's Schultz 1, Goodrich Survey, rigging up.

Continental Oil Company's Petrich 1, east offset to Magnolia Petroleum Company's Rudel 1, drilling in sticky shale at 1230 feet.

Magnolia Petroleum Company's William Rudel 1, depth 5528 feet, partly under control but still blowing gas out through casing.

Bammel Test Gets Salt Water; Is Abandoned

Houston.—One of the more important wildcats of the Texas Gulf Coast was struck from the roll this week when C&C Drilling Company and Van McPhail's Dunnam 1, (known also as Erhardt 1), was abandoned after a drill stem test at 6350-6480 feet showed salt water.

Dunnam 1 was testing the Bammel prospect, located about nine miles southeast of Hufsmith. Following are a few details of interest concerning this wildcat: Elevation 115 feet; top of Hockleyensis, 5247 feet; top of Cockfield, 6170 feet.

Wildcats in Gulf Coast Approach Critical Depths

Houston.—Developments in wildcats actively drilling in the Texas sector of the Gulf Coast this week, while not indicating much of immediate importance, were such that key tests in the more prominent areas will be closely watched for the next week, during which time a number of important wells with either show for production or be abandoned.

Notably among those which approach critical depths are wildcats attempting development of flank production off domes proven productive of oil.

Turnbull and Erwin's Watson 1, lo-

cated 150 feet out of the southeast corner of an 115.2-acre tract in Stephen F. Austin Survey No. 6, Austin County, is rigging up.

In Brazoria County, E. A. Anderson et al shut down in gumbo at 2800 feet in Reynolds 1, test of a 3900-acre block in the Flag Pond district. The well, located in the Johnson Walker Borden League, is scheduled to go to the Oligocene. Rycade Oil Corporation and Amerada Petroleum Corporation's Seaburn 4, flank test at Stratton Ridge, was drilling in lime and sand at 3726 feet. Danciger Oil Refining Company's Hunt 2, Pledger, was drilling sandy shale at 7410 feet; Hunt 3 was a tentative location.

Colorado County

Humble Oil & Refining Company's O. M. Powell 1, Garwood district, Colorado County, 1399 feet west and 466 feet north of the southeast corner of Section 45, I&GN Survey, was drilling sand and shale at 1003 feet. Two miles northeast of Columbus, McCollock Oil Company's Kansteiner 1, Leander Beason Survey, 243-acre tract, set 10-inch casing at 260 feet. Weimar Development Company's H. T. Brandt 1, four miles north of Borden and in the F. Pettus Survey, tested fresh water with a slight show of gas at 4038-48 feet, and was drilling streaked sand and shale at 4635 feet. Peerless Oil & Gas Company's E. J. Frazier 1, five miles north of Garwood, is a location 660 feet from the south and east lines of a 320-acre tract in Section 11, S.A.&M.G. Railroad Survey. Plymouth Oil Company has staked a location in the Garwood district for Broussard 1, to be drilled 326 feet south and 426 feet west of the most westerly northeast corner of the H. Duffner Survey. Columbus Development Company's Milier Ranch 1, center of H&TB R.R. Survey No. 9, is digging a water well.

In Fort Bend County, Fresno Petroleum Company's Mildred T. Wood 1, Tract 474, Thomas Gleason Survey, was drilling in tough gumbo at 2020 feet. A mile northwest of production at Thompsons field, Powers Production Company's Fred Weisse 1, Samuel Kennedy Survey, was drilling in shale at 5250 feet.

In Grimes County, Petroleum Southwest Corporation's Greer 1, Pat O'Connor Survey, Carlos district, tested salt water spray and an estimated 15 million cubic feet of gas at 2730-50 feet and pulled liner and screen to deepen. Koch et al's Kaferkamp 1, 3½ miles northwest of Whitehall and in Samuel Fulton Survey, was shut down for water at 3701 feet. Preparations are being made to deepen it.

Danciger Oil Refining Company's Hook 1, 1600 feet southeast of production off the flank of Batson dome, Hardin County, tested salt water at 4725 feet. Seven Wells Corporation's Teel 1, Saratoga field flank test in Hardin County, is drilling shale below 5869 feet.

Harris County

H. H. Sloan's Cora V. Peden 1, five miles east of Tomball and in the northwest corner of the John Brock Survey, tested 14 fourbles of salt water in 22 feet of Cockfield sand and was abandoned in hard brown shalt at 6008 feet. Hamill Drilling Company's Clara Walker 1, Sage Survey, Post Oak area, is a derrick. Hamilton et al's Hargrove 1, a mile west of Fairbanks, was in sand at 3870 feet. Huffman Dome Development Company's E. M. House, Hale prospect, Mary Magruder Survey, was drilling sandy shale at 3660 feet. Aven Oil Company's Teske 1, Cypress district, was drilling sticky shale at 3125 feet. Gholson and Parsons' W. E. Freeman 1, 330 feet out of the southeast corner of Section 57, Block 2, H&TC Survey, was rigging up. Jack Schultz was drilling in shale and lime at 5160 feet in Woodburn 1,

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SHIPPER'S PRAISE THE KATY KOMET AND FREE PICK UP DELIVERY SERVICE

Overnight Train Service and Prompt Door to Door Handling Given LCL Shipments Between Texas Cities

M. K. T. Representatives Gladly Explain Full Details of New System of Saving Shippers and Receivers of Freight Time and Money

Shippers of less than carload freight have been quick to take advantage of the savings made possible by the fast overnight schedule of the Katy Komet and Katy's free pick-up and delivery service.

They have found they can save both time and money by having shipments picked up at their door at the close of the business day and shipped on the Katy Komet which runs on a new, fast schedule between the port cities of Houston, Galveston and the major distributing centers of Dallas, Fort Worth, San Antonio. Similar fast service is given to intermediate points.

That shipments reach destination in ample time for business the morning after leaving starting point has done much to bring this combined Katy Komet and the Katy Free Delivery Service into favor.

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FOR YOUR NEXT LCL SHIPMENT SPECIFY KATY KOMET and KATY PICK UP AND DELIVERY SERVICE

August Whilock Survey, Genoa district. G. I. Lewis, Trustee's J. W. Goar 1, Sarah McKissick Survey was drilling sticky shale at 4110 feet. H. B. Jordan et al's W. S. Cochran 1, Hockley area, Abstract 293, J. Jordan Survey, was drilling blue sticky shale and pyrites at 1950 feet. John Deering is rigging up on Warren 4 at Hockley. It is 250 feet southwest of The Texas Company's Warren 2.

The Texas Company's I. N. Mitchell 1, north of Lolita in the Clements subdivision of the Stephen F. Austin League, depth 5502 feet, lost the hole to 3740 feet and was sidetracking at 5165 feet.

In Jefferson County, W. J. Parker's Winnie T. Rorick 1, A. Williams Survey, four miles north of Beaumont, was shut down in shale at 2550 feet. This test was down to 2310 feet, but lost hole back to 1210 feet. Sun Oil Company's Paggi 1, T&NO RR Survey No. 32, was drilling shale at 3042 feet.

Yount-Lee Oil Company's E. W. Boyt 1, Plummer prospect, H&TC RR Survey No. 17, Liberty County, was drilling shale at 9235 feet. C. S. Thomas et al's Eicke 1, located on a 300-acre tract two miles east of Kenefick, was drilling sand with no show at 2075 feet. This is a 5000-foot test on a 5000-acre block.

Matagorda County

Continental Oil Company's Boker 1, Citrus Grove district of Matagorda County, Lot 17, Robbins mil-subdivision, J. Chriswell Survey, set 1950 feet of 13⅜-inch casing and was drilling the plug. Oils Consolidated, Incorporated's Hawkins 1, will be drilled 2100 feet northeast and 130 feet northwest of the southwest corner of Hawkins 1500-acre pasture in the Daniel McCarthy Survey. R. L. Sprinkle's Turner 1, two miles northwest of Van Vleck, in the Morris Cummings Survey, was reported drilling below 1200 feet.

Fostoria Lumber Company's Foster Lumber Company 1, H&TB RR Survey 2, Montgomery County, has cemented 10¾-inch casing at 1090 feet and was drilling sandy shale at 3165 feet. Showers and Moncrief's Chase National Bank 1, 694 feet north of the south line and 3325 feet east of the west line of the Daniel Garrett Survey, Abstract 224, is rigging up. R. L. Sprinkle's G. W. Sutherland 1, 1350 feet from the north line and 1450 feet from the east line of the C. M. McRae Survey, is a location.

Polk County

In Polk County, S. F. Gist Oil Corporation's Kavanaugh and Collins 1, 40-acre tract, Augustine Viesca Survey, is rigging up. D. B. McCall et al's O. S. Gay 1, 200-acre tract, G. B. Dyckes Survey, is a location. Dick Schwab's Davis-Holmes 2, Livingston field district, was in sandy shale showing oil at 4394 feet. Shell Petroleum Corporation's Munson 1, Livingston area, tested three joints of mud and oil at 4320 feet. Seven-inch casing had been set at 4282 feet. Joseph L. Anderson's E. I. Duke 1, Ace dome, was shut down at 5304 feet. C. E. Stewart et al's J. D. Stephenson 1, Elisha Stephenson Survay, Abstract 761, was rigging up.

In Wharton County, Daniel Brothers' Dayvault 1, 298-acre tract, Williams Kincheloe Survey, was drilling in shale at 5800 feet. Pure Oil Company's Stewart 1, near Louise, was fishing at 8015 feet. Pure's Kuntz 1, Section 27, Morris and Cummings Survey, set 10¾-inch casing at 1185 feet, and was drilling sandy shale at 3650 feet. Smith, McDannald & Shell Petroleum Corporation's J. L. Ridgeway 1, Section 8, H&TC RR Survey, twisted off a drill stem at 2456 feet and was fishing.

Coastal Louisiana Has Active Week

Houston.—From the standpoint of field results, Louisiana Gulf Coast closed one of the most active weeks in several months.

Seven completions were recorded, including four oil wells.

While the best well of the week was Union Sulphur Company's Humble 6, completed in East Hackberry field at 6013 feet for an initial production estimated at 1333 barrels, Gueydan, Lake Washington and Sulphur fields also contributed one producer each.

Initial production from the four producers totaled 2467 barrels.

A detailed list of the week's completions follows:

Company, Well and Location	Init. Prod. Bbls.	Depth
Bay St. Elaine—		
The Texas Co., Bay St. Elaine Schoolboard 1	*	4604
Choctaw Dome—		
Standard Oil Co. of Louisiana, Myrtle Grove-Wilbert 4	*	2148
East Hackberry—		
Union Sulphur Co., Humble 6	1333	6013
Gueydan—		
Pure Oil Co., Mulvey Irrigation Co. 2	*	4850
Mulvey Irrigation Co. 3 (wo)	104	4299
Lake Washington—		
Humble Oil & Ref. Co., Cochrell-Moran 10	400	1165
Sulphur—		
Union Sulphur Co., Fee 747, (wo)	104	4299

*Failures; †Junked; §Million cu. ft. gas.

Conroe Continues to Lead Coast in Flush Oil Yield

Houston.—Conroe field, despite the fact that a majority of locations in the proven area are expected to be drilled in before the end of the year, continues to contribute the bulk of flush oil in the Texas sector of the Gulf Coast.

This week nine completions at Conroe yielded 13,536 barrels of the Gulf Coast's total of 17,685. It is the only field in the Texas Gulf Coast where completions have consistently averaged better than 1000 barrels on initial gauge.

Nineteen completions in all were recorded in the Texas Gulf Coast this week, and of these 17 were commercial oil wells, one a gas well at Tomball, and one a wildcat failure in Waller County.

A detailed list of the week's completions follows:

Company, Well and Location	Init. Prod. Bbls.	Depth
Barbers Hill Field—		
Sinclair Prairie Oil & Gas Co., Wilburn 14 (wo)	720	4690
Blue Ridge Field—		
San Jacinto Oil Co., Blakely 1	200	4560
Conroe Field—		
H. M. Crighton, South Texas Development Company B-1	1800	5135
Gulf Coast Drlg. & Prod. Co., Keystone Mills B-9	2400	5133
Humble Oil & Ref. Co. Madeley 36	168	5098
South Tex. Dev. Co. A-35	1224	5150
Wiggins & Athey 4	1128	5135
Wooten 1	1224	5139
Sun Oil Co., South Texas Development Co. 3	1152	5138
The Texas Co., Rhodes 8	2520	5110
Tide Water Oil Co. & G. W. Strake, Lewis A-22	1920	5124
High Island Field—		
Yount Lee Oil Co., Cade 35	138	5311
Hull Field—		
Empire Gas & Fuel Co., Barngrover 25	50	3160
Pierce Junction Field—		
Rio Bravo Oil Co., Settegast A-11 (wo)	425	4391
Thompsons Field—		
Gulf Prod. Co. & Humble Oil & Ref. Co., F. I. Booth 17-A	1368	5380
Wolters 1	336	5393
Tomball Field—		
Humble Oil & Ref. Co., Jacob F. Kobs 1	912	5575
Magnolia Pet. Co., William Rudel 1	§5	5528
Waller County—		
Trapshooter Riley Oil Co., Menke 1, Justo Liendo Sur.	*	5207

*Failures; †Junked; §Million cu. ft. gas.

Only Routine Progress in South Louisiana Wildcats

Houston. — Only routine drilling progress was reported during the week by wildcats drilling in parishes comprising the Louisiana Gulf Coast.

Barnsdall Oil Company's William Cypress Company 1, Labadieville prospect, centering around Section 38-14s-14e, Assumption Parish, was drilling in sandy shale slightly below 5110 feet, having encountered light shows above 2746 feet.

Union Sulphur Company's J. C. Stout Lumber Company 1, Section 36-8s-8w, Calcasieu Parish, was drilling in shale at 6030 feet. Quintana Oil Company's Nelson 1 was drilling shale at 4720 feet.

Pure Oil Company's deep test at Sweet Lake, Yount Lee 11, after plugging back from 8070 feet in shale to 7350 feet, landed 8⅝ casing at 7333 feet, and was completed for 69 barrels per hour.

Standard Oil Company of Louisiana's Myrtle Grove-Wilbert 4 at Choctaw dome, Iberville Parish, was in cap rock at 2384 feet, but plugged back to 2148 feet, set two joints of screen, swabbed dry and was abandoned.

On the Roanoke prospect, Jefferson Davis Parish, Humble Oil & Refining Company's Devilbiss 2 was drilling in sand at 7458 feet. B. D. Fenley's Clarphy Legion 1 was shut down in shale at 5008 feet.

In Rapides Parish, J. L. Beck's Hixon and Simmons 1, was shut down in blue shale at 1650 feet. J. L. Nelson's Baum 1 was rigging up. John Hincey's Murphy 1 was rigging up. G. W. Hindman et al's Long Bell Lumber Company 1, Section 30-3n-2w, was moving in a rig.

E. B. Hopkins et al's Standard of Kansas 1, Section 83-10s-6e, St. Martins Parish, set 16-inch casing at 85 feet, and was drilling in shale at 1277 feet.

In Vernon Parish, Robert K. Williams, Trustee, was drilling sand at 2325 feet in Llano del Rio 1, SEc NE Section 6-1n-9w. Dawson's Delta Land & Timber Company 1 was shut down at 650 feet.

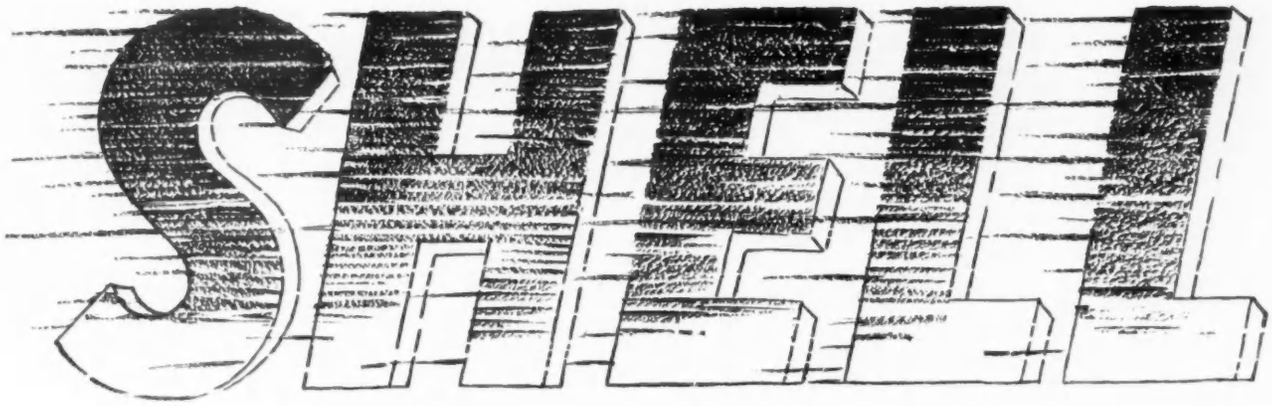
At Gueydan, Vermilion Parish, Pure Oil Company's Alliance Trust Company 4, west offset to Mulvey 2, had a sand with a fair show at 3459 feet, but the attempted drill stem test was not successful; Pure's Alliance Trust Company 5, 1050 feet west northwest of Alliance Trust Company 3, was drilling in sand at 3948 feet; Pure's Mulvey 4 is rigging up.

Converse Gets Pipe Line Outlet; 265 Barrels Daily

Shreveport, La.—Converse, North Louisiana's new shallow oil field, appeared in the production column last week for the first time, Standard Pipe Line Company having recently made connections to the wells, the field's first outlet. The average runs for the first week were 265 barrels.

After landing a string of 4½-inch casing six feet off bottom with total depth of 3061 feet, Sabine Production Company on Thursday, July 13, drilling plug and were preparing to bail Whitney Corporation 1, Section 4-9-13.

Helena Oil & Gas Company's Pugh Estate 1, SE SE Section 18-9-13, which had a good show at the 1600 foot level, logged base of the Annona chalk at 2041 feet and is planning to plug back to the 1600-foot zone and use acid; elevation is 240 feet; R. L. Gay Trustee's Bowman-Hicks-Cooke 1, SW NE Section 22-9n-13w, has set surface casing below 100 feet; H. C. Lessenger's Bowman-Hicks 1, NW SW Section 13-9-13, cored the Ozan with no show at 2312 feet and later was drilling sand at 2360 feet; Joe Modisette's Frost Lumber Industries 3, NE SW Section 16-9-13, is coring at 3180 feet.



Record Week Is Reached In Louisiana Drill Permits

Shreveport, Louisiana.—Due mainly to new work projected in Sabine Parish, where 26 permits to drill were granted, Louisiana established a record in permit grants this week when 42 were issued.

Contrary to conditions in Kansas, Oklahoma and Texas, where permits granted this year are far below those granted last year during the corresponding period, Louisiana thus far has shown a substantial gain. This week's issuance brought the total for the year up to 345, whereas during the corresponding part of 1932 Louisiana had granted only 264 permits.

In Acadia Parish, Y. D. Snell, Beaumont, was granted a permit to drill John Marsh Farm and Canal Company 1, 4960 feet south and 470 feet east of northwest corner of Section 41-9s-1w.

In Bossier Parish, C. A. Luttrell et al, Cotton Valley, were granted a permit to drill Doles Estate 1, 330 feet north and east of southwest corner of Section 29-21n-13w.

In Caddo Parish, W. T. Edwards, Texarkana, was granted permits to drill W. B. Noel 1, 660 feet south and 200 feet west of northeast corner of Section 34-20n-16w; J. S. Joyce 1, 600 feet west and 200 feet south of center of Section 35-20n-16w.

In Cameron Parish, Union Sulphur Company, Sulphur, was granted a permit to drill Humble 7, 1010.7 feet north and 661.1 feet east of southwest corner of Section 12-12s-10w.

In Iberia Parish, Jefferson Lake Oil Company, New Iberia, was granted a permit to drill Lake Peigneur 63, 115 feet east-southeast of Well No. 59 and 123 feet north of Well No. 52.

In LaFourche Parish, Barnsdall Oil Company, Tulsa, was granted a permit to drill Harang 1, 1600 feet due north of point on left bank of Bayou LaFourche which point is 2600 feet down stream from southeast corner of Valentine Plantation in T. 17s-R. 20e.

Atlas Acquires Standard Tank Farm in Homer Area

Homer, La.—Ray O'Brien who recently bought the tank farm of Standard Oil Company of Louisiana at Martin, located in Section 9-20-8w, Claiborne Parish, has sold the farm to Atlas Pipe Line Company, whose Shreveport-El Dorado trunk line passes the farm in which there are nine 55,000-barrel tanks.

In Morehouse Parish, United Carbon Company, Monroe, was granted a permit to drill Anderson 1, 3852 feet north and 3757 feet west of corner of Sections 41, 22, and 27 in Section 41-21n-5e. United Gas Public Service Company, Houston, Texas, was granted a permit to drill Crossett 29, 661 feet east and 660 feet north of southwest corner of Section 17-22n-5e.

In Plaquemine Parish, Humble Oil & Refining Company, New Orleans, was granted a permit to drill State Land Lake Washington 3, 2920 feet north and 19 feet east of State "Wash" in T. 20-s-R. 26e. Texas Gulf Sulphur Company, Myrtle Grove, was granted a permit to drill LaFourche Basin Levee District 4, 595 feet south and 1075 feet east of northwest corner of Section 12-18s-25e.

In Rapides Parish, Chopin Lumber Company, Alexandria, was granted a permit to drill Chopin Lumber Company 1, 250 feet south and east of northwest corner of SE¼ SE¼ of Section 19-6n-5w. G. W. Hindman, Little Rock, Ark., was granted a permit to drill Long Bell Lumber Company 1, 725 feet west and 395 feet south of northeast corner NE¼ NW¼ of Section 30-3n-2w. H. H. Temple, Colfax, was granted a permit to drill J. M. Barrett 1, 300 feet south and west NEc SW SE of Section 16-5n-1-w.

In Sabine Parish, Baird & Baird, Shreveport, were granted permits to drill Frank Quohagen 1, 330 feet north and east of southwest corner of SE¼ of Section 11-7n-11w; Wyatt Tramel 2, 330 feet south and east of northwest corner of SE¼ of NE¼ of Section 30-8n-11w; Wyatt Tramel 3, 330 feet south and east of northwest corner of NE¼ of NE¼ of Section 30-8n-11w; Wyatt Tramel 4, 330 feet south and west of northeast corner of Section 30-8n-11w. J. E. Bauer, Agt., et al, Shreveport, were granted permits to drill Bauer & Barthole 2, 330 feet south and east of northwest corner of SE¼ of NE¼ of Section 35-8n-12w; Bauer & Barthole 3, 330 feet south and west of northeast corner of SE¼ of NE¼ of Section 35-8n-12w; Bauer & Barthole 4, 330 feet north and west of southeast corner of SE¼ of NE¼ of Section 35-8n-12w. Crescent Drilling Company, Monroe, was granted a permit to drill Gamer 3, 660 feet south and 330 feet west of northeast corner of Section 4-7n-11w; Gamer 4, 1300 feet south and 990 feet east of northwest corner of Section 3-7n-11w. Helena Oil & Gas Company, El Dorado, Ark., was granted a permit to drill C. Jackson 1, 330 feet south and west of northeast corner of SW¼ of SW¼ of Section 10-7n-11w. Louisiana Iron & Supply Company, Shreveport, was granted a permit to drill Whitney Corporation 1, 330 feet north and east of southwest corner of NW¼ of SE¼ of Section 4-9n-13w. Pelican Natural Gas Company, Shreveport, was granted permits to drill Louisiana Long Lumber Company 21, 580 feet west and 660 feet north of southeast corner of SE¼ of SW¼ of Section 3-7n-11w; Louisiana Long Leaf Lumber Company 22, 330 feet south and east of northwest corner of SW¼ of NE¼ of Section 8-7n-11w; Louisiana Long Leaf Lumber Company 23, 330 feet north and east of southwest corner of SW¼ of SE¼ of Section 29-8n-11w. Pugh Hickman Company, Shreveport, was granted a permit to drill W. M. Blackman 7, 330 feet north and east of southwest corner of NE¼ of NW¼ of Section 36-8n-12w. Robertson Drilling Company, Ft. Worth, Texas, was granted a permit to drill J. W. Hughes 2, 600 feet west and 330 feet south of northeast corner of SW¼ of NW¼ of Section 36-8n-12w. C. T. Ruffin, Mansfield, was granted permits to drill Rafe Tille 4, 330 feet south and east of northwest corner of Section 8-7n-11w; Rafe Tille 5, 330 feet north and west of southeast corner of NW¼ of NW¼ of Section 8-7n-11w. Sabine Royalties Company, Shreveport, was granted permits to drill Bellieu & Carter 1, 330 north and east of southwest corner of S½ of NW¼ or SW¼ of Section 21-9n-13w; Edwards Estate 1, 330 feet south and east of northwest corner of S½ of SE¼ of Section 29-9n-13w; Graham 1, 330 feet north and west of southeast corner of W½ of NW¼ of Section 20-9n-13w; Graham 2, 330 feet south and east of northwest corner of W½ of NW¼ of Section 20-9n-13w. Self & Kissick, Many, were granted a permit to drill G. I. Paul 1, 330 feet south and west of northeast corner of NE¼ of SW¼ of Section 9-9n-13w. A. L. & E. J. Waller, Tr., Shreveport, were granted permit to drill J. A. Greer 1, 108 feet north and 500 feet west of southeast corner of SE¼ of NE¼ of Section 24-8n-12w. Whitney Corporation, Shreveport, was granted permits to drill Whitney Corporation 1, 330 feet north and west of southeast corner of SE¼ of NE¼ of Section 5-9n-13w; Whitney Corporation 2, 330 feet north and west of southeast corner of SE¼ of NE¼ of Section 5-9n-13w.

In Terrebonne Parish, The Texas Company, Shreveport, was granted a permit to drill L. L. E. Lake Barre 9,

4013 feet south and 305 feet east of northwest corner of Section 30-21s-20e, in Section 36-21s-19e.

In Vermilion Parish, Pure Oil Company, Houston, Texas, was granted a permit to drill Mulvey Irrigation Company 2, 1515 feet south and 1150 feet west of northeast corner of NW¼ of NE¼ of Section 34-11s-1w.

North Louisiana Results for Week Are All Failures

Shreveport, La.—Eleven new locations were announced in North Louisiana last week, eight wells were completed, all failures except a small gasser in the Ouachita Parish part of the Monroe gas field, and six locations were abandoned.

In East Carroll Parish on a large block of wildcat acreage, Marr & Collins have made location for Desha Lumber Company 1, SW NW Section 42-21n-12e. Another northeast Louisiana wildcat location is H. & H. Drilling Company's H. H. Read 1, NW NE Section 33-22n-2e, Union Parish..

The following locations were abanddoned: Caddo Parish (Pine Island): Lockhart and Trammell's Surrey Oil Company 1, Section 3-20n-16w; Roberts & Wimberly's J. S. Noel 1, Section 12-20-16; Sabine Parish: E. D. Holcomb's Shuford 1, Section 34-8-12; Rowland Oil Company's D. E. Stephens 1, SE NW Section 17-9-11w (Spring Ridge wildcat district); B. R. White et al's Cooper 1, Section 32-8n-11w; C. G. Hoff, Inc., J. J. Pressley 1, Section 2-3n-12w, a wildcat.

Completions last week in North Louisiana follow:

Company, Well and Location		Init. Prod. Bbls.	Depth
Bienville Parish—			
Towery Drilling Co., T. J. Lawhon 1, 15-16n-8w	*		3307
Caddo Parish—			
Nelson Oil Corp., W. F. Taylor 1, 13-18n-14w	*		3017
Claiborne Parish (Haynesville)—			
Haynesville Partnership, J. L. Garrett 1, 24-23n-8w...	*		4707
Morehouse Parish—			
Texas Co., W. E. Sissin 1, 20-22n-7e	*		3523
Ouachita Parish (Monroe)—			
Inabnet & Pipes, Van Horn 3, 14-18n-4e	¶	¾	2225
Sabine Parish (Converse)—			
C. D. Loe, Trustee, Whitney Corporation 1, 12-9-14 ...	*		2205
Sabine Parish (Zwolle)—			
Euford et al, Webb 2, 31-8n-11w	*		2562
Service Drilling & Royalty Corp., Gardner B-2, 7-7n-10w	*		2833

*Failures; †Junked; ¶Million cu. ft. gas.

Two Start, Two Quit in Quiet Week in Arkansas

El Dorado, Ark.—Two locations were announced last week in Arkansas, one well and one location abandoned.

In Nevada County, near Prescott, Gee & Lynch have assembled a wildcat block and made location for Porter 1.

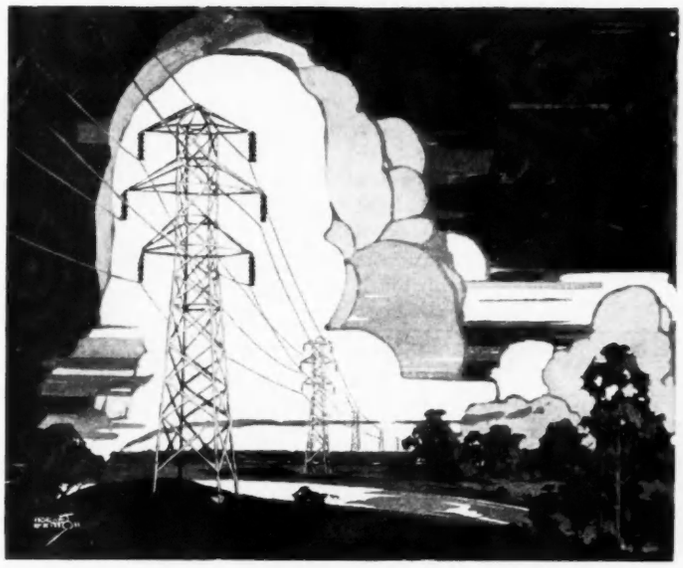
In the Bodcau district of Lafayette County, Loring Oil Company has materials on location for Henson 1, NW Section 23-19-24.

In Miller County, Garland district, John C. Rogers, Incorporated, abandoned location for Price 1, NW Section 17-16s-25w. A 4000 foot test by Duluth-Arkansas Oil Company in the same area was abandoned.

Company, Well and Location		Init. Prod. Bbls.	Depth
Miller County—			
Duluth-Arkansas Oil Co., H. Z. Price 1, 18-16s-28w....	*		4015

*Failures; †Junked; ¶Million cu. ft. gas.

Jackson, Miss.—R. G. Stivers et al, drilling Blake Estate 1, Section 15-17n-4e, Warren County, Mississippi, near Vicksburg, now plan to make a 5000-foot test, it was reported here last week. The test is drilling in Midway below 3800 feet; elevation is 101 feet; Wilcox was logged at 2945 feet.



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Bureau Shreveport Office Closed in Economy Drive

Shreveport, La.—Effective July 15, the United States Bureau of Mines in Shreveport was closed, as a part of the government's retrenchment policy. Raymond E. Heithecker, who is an engineer and the only employe of the office, is winding up collection of data for a bulletin on the Zwolle oil field of Sabine Parish. He has also gathered data on the use of acid in that field. Closing of the office in Shreveport leaves the state without any personnel of the bureau of mines within its borders.

Mr. Heithecker plans to remain in Shreveport and enter private pursuits.

North Montana Discovery Well Being Put on Pump

Cut Bank, Mont.—Completion of a 150-barrel well, three miles south of the Canadian border and about the same distance east of the Blackfeet Indian reservation, is regarded as proving another new light oil field in northern Montana. The well is a joint test of Santa Rita Oil & Gas Company and the P. T. Sweeney interests; Jacobson 1, NW NW Section 23-37n-5w. The Stewart sand showed some oil along with about 1,000,000 cubic feet of gas, and the Darling sand 13 feet of saturation and some additional gas. Below the Darling sand water was encountered and the hole was plugged back to 2616 feet. At this depth the well swabbed 175 barrels daily. It is now being put on the pump.

As the new well is about 13 miles from the Buckley-Border field, it is stated that Imperial Oil Company, Limited, has under consideration plans for extending its Coutts line through Buckley-Border to the well. This would connect the field with the company's refinery at Coutts, southern Alberta, Canada. Cost of the line would approximate $100,000.

As yet the field has not been officially named, but has been referred to as "North Cut Bank." Because of the structure having been thoroughly geologized and strongly recommended by Irvine E. Stewart, chief geologist for Santa Rita Oil & Gas Company, there is a movement on foot to have the new field named the "Stewart Pool." In fact, Mr. Stewart recommended the structure after it had been reported upon unfavorably by several other geologists.

It is understood that Santa Rita Oil & Gas Company and several others plan to start an intensive drilling campaign in the new pool immediately.

Billings, Mont.—Refinery of Independent Oil & Refining Company at Laurel, southwest of here, is running on full time and employing about 40 men. The refinery has a charging capacity of 3000 barrels and is operating on Oregon Basin and Dry Creek crudes. The plant was recently taken over from the Laurel Oil & Refining Company and completely remodeled after it had been standing idle for about two years.

Indian Land Operations Continue Most Interesting

Cut Bank, Mont.—Interest in drilling operations in the Cut Bank field on the Blackfeet Indian reservation in northern Montana continues to center in the test being drilled by W. M. Fulton and his Canadian associates on the Haggerty allotment, NW Section 14-34-6w. This location is approximately 2½ miles west of the nearest producing well on the reservation. Should it come in as a commercial producer, it will lead to the immediate starting of a number of new wells in this sector of the area. When last reported the hole was bottomed at 2913 feet and trying to sidetrack bit. Hole is believed to be bottomed very near the top of the producing sand.

The Texas Company has let a contract to Sheldon-Burden Corporation for a rotary test northeast of the Santa Rita Oil & Gas Company's tribal wells. Location is CNW NE Section 14-35-6w on the Fisk-Kerns ranch. The contracting company is moving its heavy rotary outfit from the Milk River location north of Browning to The Texas Company test. The well is in new territory and will be the first to be drilled with a real rotary outfit. It is stated that the company has authorized the drilling of two additional tests, but has not made public the locations.

Two new locations are reported in the proven area. Both are building rigs. They are Ty Cobb's Walberger 1, SE Section 35-34-6w, and Hannah Porter Oil & Gas Company's Britton 2, SE Section 14-34-6w.

Dakota-Montana Oil Company has completed Haglund 1, NW Section 14-34-6w, at 2883 feet. It made 75 barrels initial on the pump.

Santa Rita Oil & Gas Company is cleaning out after a shot, Blackfeet 2, NW Section 15-36-6w. Test had a good showing of oil at 2825 feet. It was shot with nitro-glycerine. This is the first well in the field to be shot with liquid explosives. Same company's Sims-Olson 1, NE Section 26-34-6w, is standing with casing cemented on top of sand at 2840 feet. Well should be an early completion. There are seven other operations under way in the field.

Calgary, Alberta, Canada.—Madison Oil Company of this city is planning a wildcat test in the Border district a few miles northwest of Santa Rita Oil & Gas Company's Jacobson 1 in the Stewart or North Cut Bank field. Test will be located on the Canadian side of the border.

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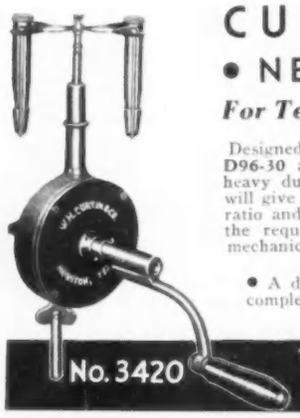
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First Try With Rotary in North Montana Interesting

Helena, Mont.—The first test to be drilled with modern rotary equipment in Montana will be spudded this next week —The Texas Company's Fisk 1, NW NE Section 14-35-6w, northeast of the proven area in the Cut Bank oil field. The new operation bids to be the most interesting wildcat in Montana, as it will determine to a large extent use of rotary equipment in northern Montana in the future.

The test, now rigging up, is a few miles northeast of the Santa Rita Oil Company's producing tribal wells. The Texas Company has 50,000 acres under lease in the Cut Bank district, the majority of the holdings being on the Blackfeet Indian reservation. Fisk 1 is the company's first test for oil production in the Cut Bank area. The company has surveyed a line from the Cut Bank field to its refinery at Sunburst. Contract for drilling the well has been let to the Sheldon-Burden Drilling Corporation of Calgary, Alberta, Canada. Contractors moved in rotary equipment from the abandoned wildcat on the Milk River structure in northern Montana.

William M. Fulton's Haggerty 1, NW Section 16-34-6w, wildcat test south and west of the proven area in the Cut Bank field, is still attempting to sidetrack bit. Hole is bottomed at 2926 feet on what is believed to be the Darling sand, its objective. Blackfeet Indian Tribal Council has refused to lease any more acreage until the Fulton well is completed.

Joint test of the Empire Drilling Company and Enterprise Oil Company on the Lodge Grass wildcat structure in Carbor County is drilling at 3500 feet. The test, Lynde 2, SW SW SE Section 21-6s-35e, is believed to be within 50 feet of its objective, the Dakota sand, and should be an early completion.

Hawkeye Oil Company is reported making good progress in wildcat test on the Willow Creek structure in Mussellshell County. The test, NE NW SE Section 20-11n-23e, is drilling below 700 feet.

Jack Creek Oil Company is cleaning out No. 2, NE NW SE Section 15-7s-23e, in southern Carbon County, east of the Dry Creek field, preparatory to running 8¼-inch casing to bottom at 1304 feet. A fishing job at 3516 feet continues to hold up progress of Golden Valley Oil Company's wildcat, SW SE SE Section 28-6n-22e, on the Belmont Dome structure in Golden Valley County. Hole is bottomed at 3570 feet.

Oregon Flatwillow Development Company is drilling below 1250 feet in a wildcat on the Flatwillow structure, SE SE SE Section 3-13n-26e. Drilling was resumed in this test last week after it had been shut down since last winter. Northland Oil & Gas Company has resumed operations in Yurman 1, SE SW Section 32-33-5e, which has been standing since last fall with hole bottomed at 3815 feet. This test will be drilled 400 or 500 feet deeper to the Wilcox sand, its objective.

Good Producer Proves More Dry Creek Acreage

Billings, Mont.—One of the best completions in the Rocky Mountain region in months is Ohio Oil Company's Souders 9, SW Section 2-7s-21e, in the Dry Creek field in southern Montana. The well is producing from the Lakota formation and is estimated as good for 1000 barrels a day or better. Before it was tubed to bottom at 5509 feet it made one flow of 250 barrels in one hour. It is pinched in and allowed to make approximately 300 barrels daily. Location proves up some additional territory being a third of a mile northeast of the nearest producing wells.

Work Progressing on Pipe Line from Blackfeet Lands

Cut Bank, Mont.—Preparations are going forward rapidly here for the construction of the Santa Rita Oil & Gas Company's 15 miles of four-inch line from its Blackfeet Tribal leases to its refinery site two miles east of Cut Bank. The contracting firm, Winston Brothers Construction Company, is moving in equipment for the laying of the line. Contract for stringing the pipe and back-filling has been let to John Hall of Great Falls.

Santa Rita Oil & Gas Company has an ideal site for a refinery along both sides of the Great Northern railway tracks just east of Cut Bank, with an assured water supply from the Cut Bank river. The land south of the tracks is elevated 25 or 30 feet above the railway and will be used for a tank farm. The refinery will be built north of the tracks, allowing the crude from the storage tanks to gravity to the loading racks and also to refinery. While no announcement has been made as to the building of the refinery, it is believed that work will be started on same within the next 60 days.

Grand Junction, Colo.—Mountain State Gasoline Corporation has completed No. 6, SE Section 4-34-62, on the Garcia Dome in western Colorado at 1210 feet. It has an open flow of 200,000 cubic feet of gas. The company operates a gasoline plant in the field, the gas averaging about three gallons to the 1000 cubic feet.

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Rio Blanca Wildcat Making Oil, Quantity Not Stated

Denver, Colo. — Variously estimated from 500 to 1000 barrels the California Oil Company's deep wildcat test a little south of the proven area in the old Rangely shallow pool in Rio Blanca County was this week shot for the third time. Total quantity of explosives used is 1000 quarts. Well was shot in the Pennsylvanian series between 5750 and 6315 feet. Test is located in the NW SE Section 30-2n-102w. Company has not been disclosing quantity of oil Raven 1 is making.

Mountain Fuel Supply Company has resumed drilling Hatch 1 after drilling up lost cutter-heads. This test is located on the Sugar Loaf Butte structure, south and west of Hiawatha Dome oil and gas field. The test, NW SW Section 9-11n-101w, is drilling at 2090 feet. The company's Wheeler 1, NW Section 30-12-100, west Hiawatha Dome, Moffat County, is rigged up and ready to spud.

Crawford Oil & Gas Producing Company is reported moving in material on two new wildcat locations spotted last week near Crawford in Delta County; Pipher 1, NW SW Section 36-15s-92w, and Young 2, NW SW Section 32-15s-91w.

In Freemont County, Cherry Creek Placer Company's Lucas 1, SW SW NE Section 32-18s-69w, is drilling at 2100 feet.

Ute Oil Company is setting 15½-inch casing to shut off surface water in Mossman 1, SW SW Section 33-9n-78w, in Jackson County.

On the Terrico wildcat structure in Las Animas County, southeastern Colorado, Continental Oil Company is drilling below 515 feet in Maxwell Grant 1, NE NW NE Section 29-34-68.

Oil City Petroleum Company is drilling at 511 feet in Crowley 4, SE NW NE Section 14-32-1e, Archulta County.

After shutting off water with 6¼-inch surface casing at 316 feet, C. Leonard Smith et al's Union Pacific 2 is drilling at 630 feet. This test is located on the Sand Creek wildcat structure, Section 31-12n-69, Larimer County.

Shastatex Oil & Gas Company's Lotus 1, NW NE NE Section 15-23s-64w, on the Lamar anticline, Prowers County, is reported drilling in salt at 1400 feet. Salt was topped at 1305 feet.

Mechanical difficulties continue to check progress of South Park Oil & Gas Company's two wildcats in Park County; Milligan 1, on the Jefferson wildcat structure, NE SE Section 13-8s-76, is still trying to connect parted casing. Esche 1, SE NW Section 5-9n-76, on the Como structure, is still fishing for lost casing. Esche 1 is bottomed at 2464 feet, and before drilling is resumed the operators expect to test showings encountered in the Muddy.

On the Skull Creek anticline, Moffat County, Wm. Meyers interests have resumed drilling in State 1, NW SW SW Section 16-4n-101. Hole is bottomed at 3250 feet, and the company plans to drill test 500 feet deeper to a sand which shows saturation at its outcropping. The well has been standing since last winter.

Rangely, Colo.—The California Company is reported to have shot Raven 1, SE Section 30-2n-102, on the Rangely dome for a third time. The three shots are reported to have totaled more than 1000 quarts. Hole is bottomed below 6300 feet in the Weber formation (Tensleep). Very little information is being given out as to results. There is a rumor to the effect, however, that the well is good for 500 barrels daily.

Denver, Colo.—Colorado Interstate Gas Company has asked the city of Denver for an extension of time in which to furnish cost data on the piping of gas from the Texas Panhandle to Denver through its pipe line. Denver has been endeavoring to receive lower gas rates from the Public Service Company of Colorado, and Colorado Interstate Gas Company.

Craig, Colo.—The Texas Company has let a contract to Olson Drilling Company for a deep test on the Iles structure. Location is in northwest corner of Lot 7, Section 23-4n-92. It will be drilled with rotary equipment.

Craig Test Has Oil Show With Strong Water Flow

Craig, Colo.—Rocky Mountain Gas Company released 25,000 barrels of water along with a considerable showing of oil in Eberle 1, SE Section 9-6-21, on the Craig gas structure, three miles west of here at 1290 feet. The location is about 1500 feet west of the discovery well which also had a flow of 25,000 barrels of water at approximately the same depth. Gas in the discovery well was found at 2732 feet and the well was completed at 2807 feet. The discovery well supplies gas for the town of Craig, and the second well is being drilled as a reserve supply. It is possible that the water may be cased off to make a test of the oil showing, which is estimated all the way from 50 to 100 barrels of light green oil.

Northeastern Colorado Still Holds Interest

Denver, Colo.—While drilling operations in northeastern Colorado to date have been disappointing as to results, several of the major producing companies in the Rocky Mountain region and the Mid-Continent division are still carrying on geological research work in the territory. Most of the work is being done with geophysical instruments, and one crew is said to consist of 16 operators. In view of the great cost of geologizing the territory it has been suggested that the Colorado legislature make an effort to secure the cooperation of the federal government in making a thorough geological investigation of the region jointly by the state and U. S. Geological Survey. Proponents of this idea point out that such a procedure would undoubtedly result in valuable discoveries which in time would repay the state government, at least, for its share of the outlay in increased taxes.

Abandonment and New Start In New Mexico Wildcats

Santa Fe, N. M.—One completion, a dry hole, and one new location were reported in New Mexico wildcat operations this week. On the Stony Butte structure, San Juan County, R. R. Burke's Government 2, NW SW Section 18-21-13w, is being abandoned at 546 feet as a dry hole.

R. Spearow et al are drilling below 3000 feet in their wildcat test of the Indian Creek structure, Eddy County. Location is on NW NE Section 22-22s-23e.

Getting an insufficient water supply in its first water well, which made 850 barrels, spudding of Carter Oil Company and Continental Oil Company's joint test located NE NE Section 28-23-25, on a wildcat structure, south of the Empire pool, in Lea County, has been delayed until a second water well is completed.

On the Fulcher Basin structure, San Juan County, Fred Barret interests are drilling below 1330 feet in their wildcat, Section 11-29n-11w. Production is expected at 1400 feet in the Picture Cliff formation. This test encountered a 1,000,000-foot flow of gas at 700 feet.

Kutz Canon Oil & Gas Company is fishing at 4085 feet in Day 1, SW Section 20-28-10, a few miles east of the proven

area of the Kutz Cannon Gas field in San Juan County.

Western Natural Resource Company's Grant 2, NE Section 5-6n-1e, Valencia County, is drilling below 4700 feet.

In Debacca County, Landowners Oil Company's State 1, on the Buffalo wildcat structure, is shut down at 5860 feet.

R. C. Bailey et al's Quadruado 1, SW SW Section 34-2n-16w, is fishing for tools at 357 feet. Test is in Catron County.

In Guadaloupe County, Anton Chico Development Company, Ltd.'s Grant 1, SW Section 20-9n-17e, is drilling shale at 2587 feet.

Baxter Basin Operations Near Final Stages

Rock Springs, Wyo.—Mountain Fuel Supply Company has two near completions in territory south of here. In the North Baxter Basin field Cappers 2, Section 12-9-104, is drilling at 3040 feet in shale formation. In the South Baxter Basin field Union Pacific 2, Section 21-16-104, has cemented 8⅝-inch casing on top of the Frontier formation at 2365 feet with a considerable showing of gas.

Further south and just across the Colorado-Wyoming state line, Mountain Fuel Supply Company's Florence Wilson 2, SE Section 22-12n-101w, is coring formation at 3547 feet. This well is planned to test the Pennsylvanian formation. Wheeler 1, NW Section 30-12-100, West Hiawatha Dome, is rigged and ready to start drilling.

Worland, Wyo.—Empire State Oil Company has resumed drilling Republic 4, Section 14-44-98w, in the Hamilton Dome field, 18 miles west of here. Test has been standing since last winter with hole bottomed at 1115 feet. It is reported that the company may build a skimming plant in the field.

Casper, Wyo.—Mutual Oil Syndicate is drilling at 2410 feet in Boyer 2, NE Section 23-35-79, on Midway Dome, 12 miles north of Casper, and feeling ahead with core barrel for Shannon sand. This is the second core drill test on the structure. Another will probably be drilled before location is made for deep test.

Laramie, Wyo.—Mutual Oil Syndicate has resumed drilling in No. 9 well, NE Section 12-18-78w, in the Dutton Creek field in Carbon County. Hole has been standing with 11⅝-inch surface casing cemented at 110 feet. Oil is expected around 4800 feet. This is a rotary operation.

Wyoming Wildcat Drilling List Continues Expansion

Casper, Wyo.—With three new operations getting underway in unproven sectors in Wyoming, wildcat operators continued this week the swing into activity begun last week.

Two new wildcats are to be drilled on the Segment Basin structure just east of the North Casper Creek gas field, 25 miles northwest of Casper. Lakota Oil & Gas Company will drill one of the tests on the Segment Basin structure. First objective is mapped at 3100 feet. The Lakota Oil & Gas Company holds considerable acreage in the North Casper Creek field.

On the same structure, W. Clinton Giles, who pioneered in the development of several shallow pools in northwestern Wyoming, plans to drill a test on some of his own acreage. Giles originally mapped the structure. He is also reorganizing Golden West Oil Company, which will complete a test started more than two years ago on the Segment Basin structure. This well has been standing for more than 18 months with hole bottomed at 1250 feet.

A group of California operators, headed by Nathan W. Hale, pioneer operator in the development of Midway and San Joaquin fields in California, has acquired acreage from the Bowser-Satterfield Syndicate, West Virginia interests, on the Sage Creek structure about 10 miles east of the Lance Creek proven oil field in Niobrara County. They plan to drill a new test near the old Bowser-Satterfield well, NE NE Section 7-35-62, which has been standing for several years with hole bottomed at 1527 feet. It had a million cubic foot show of gas.

Interstate Oil & Refining Company and Fall River Royalties Company have resumed drilling in their joint wildcat test on the West Mule Creek structure, northwestern Niobrara County, after cementing tools and whipstock. Location of the test, Morrell 1, is Section 2-39-61. Hole is bottomed at 2220 feet, and is believed to be within 200 feet of objective, the Minuelusa or Tensleep sand.

Ohio Oil Company is recementing A. J. Hazlett 1 on the Allen Lake structure near Medicine Bow, in Carbon County. Hole is bottomed at 1700 feet where last week was encountered a 2,000,000 cubic foot gas flow with the second bench of the Lakota formation topped. Test is located in SW Section 34-28-79, and should be drilled in next week.

On the Riverside ranch wildcat structure, in Albany County, S. Marvin James & Company's Hindry 1, SW SW Section 10-13n-76w, is waiting underreamer and casing with hole bottomed at 1515 feet. It has had several good showings of oil and gas.

LeFaivre Oil Syndicate has resumed op-

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erations in its wildcat test on the Martin Dome structure in western Weston County. The 12½-inch casing has been set on bottom at 1700 feet. The test, located in Section 29-45n-68w, encountered a good showing of gas at 1578 feet.

After cleaning out hole in the old Gose Oil Syndicate test, on Soda Creek structure in Weston County, contractor is ready to resume drilling from 5050 feet where test has been standing bottomed for more than a year. This wildcat is located on NW Section 28-47-65.

On the Pump Creek Anticline wildcat structure, six miles north and a little west of the Osage proven oil field, J. H. Voorhees et al have resumed drilling at 100 feet. The test is in the NW Section 26-48n-64w and has been shut in since spudding last fall.

Osage, Wyo.—With higher prices for crude and a stronger demand for Osage production, the field is showing renewed activity in drilling operations. Duluth-Wyoming Oil Company has a near completion in No. 3, Section 12-48-64, in the shallow section of the field. The hole is bottomed at 1400 feet and believed to be on top the producing sand. Five other tests are drilling in the field.

Lance Creek Operations In Search of Gas Supply

Lusk, Wyo.—Drilling operations in the Lance Creek field north of here have recently been confined to tests for gas in the redeepening of old wells. The gas is utilized by J. M. Huber Company in the manufacture of carbon black. Argo Oil Company recently completed a well by deepening it from the Dakota to the Lakota formation with a daily open flow of 12,000,000 cubic feet. In the last week, J. M. Huber Company deepened a well in SW Section 27-36-65 from the Dakota to the Lakota with an open flow of 7,500,000 cubic feet. The carbon black is manufactured in the field and trucked here for shipment by railroad.

Kemerer, Wyo.—Calmonica Petroleum Corporation apparently has a small producer in Elkorn 2, SE Section 27-27-113, in the LaBarge oil field in southwestern Wyoming. Sand was topped at 2220 feet. The Calmonica development extends the field a considerable distance to the north. The first well on the lease having an initial production of 125 barrels.

Woolf Petroleum is drilling below 700 feet in No. 3-LL, SW Section 5-27-113, in the same field.

Allen Lake Structure Test Shows Favorably for Gas

Laramie, Wyo.—Ohio Oil Company has a showing for a good gas well on the Allen Lake structure north of Medicine Bow and about 50 miles northwest of here. The well is A. J. Hazlett 1, SW Section 34-23-79. String of 10¾-inch casing has been set on top of a sand in the Morrison formation at 1689 feet. Before the casing was run the well was allowed to blow wide open for four hours and showed about 2,000,000 feet of gas. It will be drilled in immediately and is expected to greatly increase its production with deeper drilling. The Allen Lake structure is being developed for gas as an auxiliary supply for Rocky Mountain Gas Company's distributing system in Laramie. It is planned to connect the new field with the company's pipe line from the Dutton Creek field to Laramie. The new line will be approximately 22 miles in length and probably consist of six-inch pipe.

Pick-Up Is Noted in Eastern Field Results

Cleveland, Ohio. — A substantial pick-up was noted this week in Eastern States field results when 31 completions, including nine oil wells, 14 gas wells and eight failures, were reported.

Ohio, which has led the district for several months in drilling, was foremost in point of completions with four oil wells, 11 gas wells and only two failures. These four oil wells accounted for 37 barrels out of the total of 95 barrels of flush oil for the district this week.

Pennsylvania

Company, Well and Location	Init. Prod. Bbls.	Depth
Washington County—		
E. H. & J. B. Tague, Moore 1	15	....
West Virginia		
Boone County—		
Pond Fork Oil & Gas Co. 1	*	3055
Pure Oil Co., Pocatello	¶	2996
Ritchie County—		
H. N. Reinhart, Markey 1	*	1885
Roane County—		
Reedy Oil & Gas Co., Knopp 2	15	1750
Wayne County—		
West Virginia Gas Corp., Watts 1	¶	3649
Wood County—		
C. T. Smith, Webber 1	*	1225
Kentucky		
Daviess County—		
Mecca Oil Co., Duncan 1	*	....
A. D. Schaffer, Malley 1	16	....
McLean County—		
McLean Development Co., McManama 4	2	....
Mike Callas & Co., Atherton Heirs 3	10	....
Ohio County—		
Vickers & Co., Dickens 1	*	630
Illinois		
Bond County—		
Bachelor & Co., Merry 1	*	....

Southeastern Ohio

Company, Well and Location	Init. Prod. Bbls.	Depth
Monroe County—		
Valentine Oil & Gas Co., Gibson 1	¶	1130
Washington County—		
Williams Bros., Male 2	¶	1171
C. W. Nuzum, Wilson 2	*	1162
J. T. Campbell, Martin 13	5	1166
Central Ohio		
Belmont County—		
A. C. Peters & Co., McLaughlin 3	¶	1820
Hocking County—		
Ohio Fuel Gas Co., Sunday Creek Coal 102	¶	1088
City Natural Gas Works, Dupler 5	¶	....
Fairfield County—		
City Natural Gas Works, Stalder 2	¶	2254
Meigs County—		
Joe Rubin, Schreiber 1	*	865
Medina County—		
Spohn & Co., Bason 4	10	....
Stark County—		
Brendel Producing Co., Bivenour 1	¶	4575
Unger 1	¶	4486
Northwestern Ohio		
Allen County—		
C. A. & F. J. Peavey, Hoover 7	2	....
Logan County—		
Simms Oil & Gas Co., Porter 3	¶	1457
Wyandot County—		
Clarence Donnell, Techanen 1	¶	1430
O. A. Humbarger, Koehler 1	¶	....
Jones & Coyle, Brillhart 3	20	....
Indiana		
Gibson County—		
Knox Engineering Corp., Sampley 2	¶	....

*Failures; †Junked; ¶Million cu. ft. gas.

Macomb County Will Have Wildcat Test

Mt. Pleasant, Mich.—A wildcat test will be drilled in Macomb County, Bruce township, NE NW NE Section 17, by Oil & Gas Corporation.

Core testing carried on this district is believed to have located a favorable structure and the location is based on these core tests and geology worked out by William F. Brown, former Pure Oil Company geologist.

Approximately 6000 acres are held in fee or lease by the company in the district of the test. Drilling operations are to start immediately.

Twelve permits were issued this week bringing the total to 25 this month, a record for any previous two weeks period of the year. Total permits for the year are 153 as compared to 183 for 1932.

The permits follow:

In Midland County, Pure Oil Company's Naramore 5, Porter township, NE SE SW Section 15; Yatts 1, Greendale township, S½ SW SE Section 35; Corning 2-A, Jasper township, S½ NW NW Section 1; State-Porter 2, Porter township, SW NW SE Section 15; Mullet 9, Greendale township, NE SW NE Section 15; Mullet 10, Greendale township, SE SW NE Section 15.

Gordon Oil Company's Good 1, Porter township, NE NE SE Section 17; Muscott 3, Porter township, NE NW NE Section 17; Muscott 4, Porter township, SW NE NE Section 17.

Stork Oil Company's Baxter 1, Porter township, NE NW NE Section 22.

Isabella County — T. K. Buzard's Battles Estate 1, Vernon township, N½ SE NE Section 35.

Michigan Record Depth Well Drilling Ahead

Mt. Pleasant, Mich.—Michigan's record depth test well, Newaygo Oil & Gas Company's Bates 1, Newaygo County, Sherman township, Section 12, is still drilling ahead, now drilling below 6465 feet in Trenton lime, topped at 6385 feet. As far as has been reported no shows of oil or gas have been uncovered in the present formation.

A. J. Bates, head of the drilling company, indicated that drilling would be continued through the Trenton and possibly to 7000 feet or more.

Bates 1 passed the old state depth record of 6310 feet in April, 1933. Progress has been slow with an average of five to 10 feet a week. Only day tour is worked.

Michigan Gas & Oil Company's Busche 1, Isabella County, Wise township, Section 10, is drilling below 3500 and expect to top Dundee lime between 3700 and 3800 feet. A commercial well on the Busche would project the Vernon oil field six miles northeast.

In same county, Strange & Flynn's Currie 1, Vernon township, Section 5, is drilling ahead of 2900 feet.

Columbia Oil & Gas Company's Travis 1, Midland County, Greendale township, Section 32, is drilling below 3200 feet with completion in Dundee lime expected within the next 10 days. The test is located two miles west of production.

Thompson & Fortney's Currie 1, same county, Mt. Haley township, Section 16, is drilling at 3075 feet, and in Lee township, same county, Greendale-Lee Oil Development Company's Hitsman 1, Section 13, is drilling at 2100 feet; W. Hunter Atha's Talker 1, same township, Section 7, is drilling at 2165 feet.

Outpost tests in Porter township, Midland County, now include a number of interesting wildcats that are expected to better define the limits of the new pool.

A. P. Scheid's Acker 1, Section 24, is drilling below 1300 feet; O. H. O'Neal's Caywood 1, Section 6, is fishing at 1120 feet; Wells Brother's McCann 1, Section 25, is drilling at 300 feet; Wilson Trustee's Carter 1, Section 18, is drilling ahead of 2150 feet; Wilson Trustee's Hathway 1, same section, is drilling at 1300 feet.

McClanahan Oil Company's Densmore 1, Section 4, and Hathway 1, Section 17, are both fishing. The Densmore 1 stands at 1190 feet and Hathway 1 at 3389 feet.

In Saginaw County, Richland township, Joe Molloy's Baurer 1, Section 7, is shut down at 25 feet.

Ira Scheifley's Bambouskirk 1, Clare County, Greenwood township, Section 4, is driving pipe at 610 feet.

Porter Township Is Extended Northwest

Mt. Pleasant, Mich.—Strange and Fortney's Campbell 1, semi-wildcat test, Midland County, Porter township, NW NW SW Section 17, was completed for 350 barrels initial from 3434 feet, Dundee lime, extending the new Porter field west and north.

Campbell 1 is the farthest west test completed to date in Porter township being 1½ miles west and one-half mile north of Sun Oil Company's Miller 1, Section 16, and three-fourth mile southwest of Gordon Oil Company's Muscott 1, Section 17.

Pure Oil Company completed Naramore 1, Porter township, NE NE SW Section 15, (direct west offset to same company's State-Porter 1, biggest well in Porter field with estimated 5000 barrel initial) for 1300 barrels initial from 3431 feet.

The north offset to State-Porter 1 was completed a month ago on Naramore 2 for 360 barrels initial after running acid. East and south offsets have not been drilled.

Pure Oil Company also completed Naramore 3, Porter township, SW SW SW Section 15, for 300 barrels initial from 3412 feet.

Stork Oil Company completed Richmond 2, Porter township, Section 22, SE NW SW, for 150 barrels initial from 3415 feet.

In Isabella County, Chippewa town-

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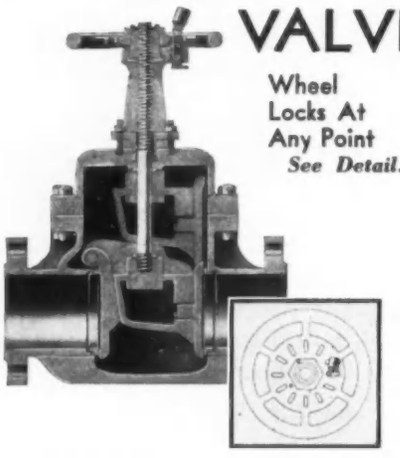
GATE and CHECK VALVE



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Write for detailed information.

WHEATLEY BROTHERS
Tulsa, Oklahoma

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Stork Oil Co., Richmond 2, Porter Twp., se nw sw, Sec. 22	150	3415
Isabella County—		
J. W. Leonard, Burrows 1, Chippewa Twp., nw ne se, Sec. 3	95	3580
Wexford County—		
Oil Properties Corp., McNit 1, Harning Twp., Sec. 10	*	3958
St. Clair County—		
Snavely & Craft, Norman 1, Grant Twp., Sec. 22	*	1800

*Failures; †Junked; ¶Million cu. ft. gas.

Michiganders Want No Production Restrictions

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"Whereas, We believe that production in Michigan should not be restricted until such production is sufficient to meet the above refining and marketing requirements,

"Therefore, be it resolved, that no restrictions or limitations be placed upon Michigan production of petroleum or upon the drilling of wildcat wells in Michigan, until such time as the production in our state approximates the requirement of the refining and consuming markets therein."

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Machinery . . . Tools . . . Catalogs . . . Books

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1. Geared Power

OIL WELL SUPPLY COMPANY

Oil Well Supply Company has developed for East Texas field the Imperial No. 80-SC (single dual-stroke crank) oilbath geared power.

This power is a compact, fully enclosed oilbath unit offered for pumping of a number of deep wells. Its horsepower input capacity is rated for oil field service 80 horsepower at 20 strokes per minute or 115 horsepower at 30 strokes per minute.

Oilwell Power

Crank and main gear revolve as a unit around the spindle which is cast integral with the reinforced, semi-steel base, and the thrust is transmitted directly to the base. No excessively heavy cover is necessary, as it is not required to support the thrust or any other load from the overhung crank. The stationary-spindle design permits a wide bearing spacing, for properly supporting the overhung crank, with minimum overall height. The pull-rod connections are close to the foundation. This, with compactness of the unit, results in low installation costs and high mechanical efficiency.

Double reduction gears are the same as those which have been proved in the No. 80 (eccentric type) powers and are properly heat-treated for maximum wear resistance and strength. Timken heavy-duty roller bearings have been selected for their particular applications.

The cast-steel crank is of the "Oilwell" dual-stroke type with two crank pin holes. The crank pin is placed in one for a 30-inch stroke and in the other for a 36-inch stroke. The pull-rod strap disc has 16 clevis holes, each provided with a hardened steel bushing. The clevis pins are drilled for Alemite lubrication.

The lubricating system of the power is simple and positive. There are no complicated parts.

Imperial No. 80-SC power can be driven by a gas, gasoline or oil engine or by an electric motor.

2. Metal Pump

ALFORD SALES & SERVICE, LTD.

Alford Sales & Service, Limited, of 3271 Cherry Avenue, Long Beach, California, announces the I. R. metal pump.

Without cups or packing, it is adaptable for use in wells making sand; where an acid condition or high temperatures are present, or where a tendency towards electrolysis is present, according to the manufacturer.

I. R. metal contains no tungsten, vanadium, chromium, cobalt, titanium, or any other of the so-called hardners. It will analyze approximately 97.50% iron and 2.5% carbon; yet the carbon content may be reduced to as low as 0.8% and still maintain hardness, the manufacturer states.

The pump is made with a plunger built entirely of I. R. metal and a liner internally inlaid with this metal. Due to the metal's characteristics, the tolerance is only .001 inch, yet there is no danger of seizing. Hardness of the liner is approximately 775 Brinell, and that of the plunger 725 Brinell. I. R. metal permits the use of this extremely close tolerance, which prevents the entrance of anything but an impalpable powder between the plunger and liner. Such powder is surrounded by or contacted with oil or fluid which so increases the scavenging effect of any particles as to eliminate their abrasive action, according to the Alford organization.

3. Improved Engines

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THE OIL WEEKLY,

Houston, Texas, U. S. A.

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Name .....

Company .....

Address .....

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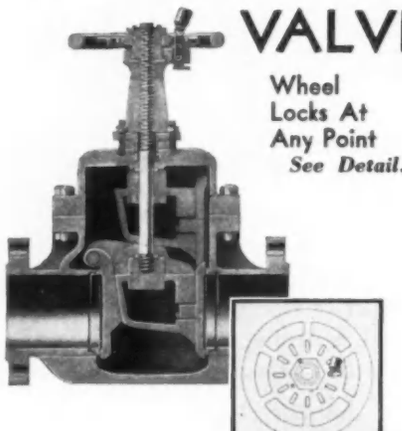

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cost on the engines described, is the result of three years research.

A basic principle is involved, making it possible by means of a simple adjustment, made while the engine is running or under load, to add an average of 20 per cent to the maximum horsepower of the engines.

When not in use for overload boosting, the device is securely locked and the engine operates more economically. The change from regular to overload, or the reverse, can be made almost instantly. The increase in overload horsepower obtained does not involve increase in RPM.

Both the "OGC" and "OFC" engines are available in 40 and 50 HP. sizes.

4. Rotary Chain

CHAIN BELT COMPANY

Chain Belt Company, 1619 West Bruce Street, Milwaukee, Wisconsin, announces a new "Rex Deepwell" rotary chain, featuring a unit link which the manufacturer claims will remain a unit.

Sidebars are die cut of alloy steel, heat treated. Pins are ground out of alloy steel and have a grooved solid cotter. They are permanently locked in the sidebars by means of a precision joint. The bushings, made of a tough alloy steel, are also ground for precision. Rollers are of tubular design steel, heat treated to stand sprocket shocks and clutching loads without opening up or "mushing" out.

Arrangement of the pin and cotter in the new chain should facilitate connecting up and taking down this chain in the field, according to the manufacturer.

CONSTANT research in field and laboratory, the use of superior crude oils, and the most modern refinery equipment are the three stones in the foundation upon which Humble quality has been built.

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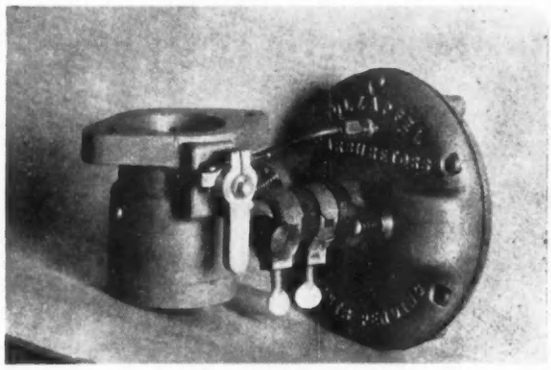
OIL AND REFINING
COMPANY

Producers, Transporters, Refiners and Marketers of Petroleum and Its Products

5. Gas Carburetor

HOLZAPFEL INSTRUMENT COMPANY

Holzapfel Instrument Company, Palos Verdes Estates, California, announces a gas carburetor designed to give automatic operation at all speeds and loads and to be suitable for use on multi-cylinder engines used in drilling and other operations, especially where the load varies greatly.



Holzapfel Carburetor

The carburetor consists of a valve which regulates the pressure and a mixer which, in conjunction with the regulator, draws in the air and gas in exactly the same proportions. A variable jet varies these proportions as desired.

The carburetor can be fitted up in a few minutes, according to the manufacturer.

6. Flexible Tank Roof Seal

THIOKOL CORPORATION

Thiokol Corporation, Yardville, New Jersey, announces "Thiokol," a rubber substitute as a flexible seal for floating roofs on oil tanks, which has been adopted by the Chicago Bridge and Iron Works, Chicago, Illinois.

Thiokol resembles rubber in many of its physical characteristics, yet contains no rubber.

The seal consists of a circular band of steel shoes connected to each other and to the top of the rim plate with a fabric impregnated with Thiokol. Hangers from the deck keep them in parallel contact with the tank shell.

It was to overcome the difficulties arising from the use of the sour crudes that the seal was developed.

Geology of California

"Geology of California," by Ralph D. Reed, recently published through the American Association of Petroleum Geologists, is a book which should stand high among the noteworthy contributions of that organization to geological literature. Although Reed, not dealing directly with the geology of petroleum, the discussions are of the problems with which oil geologists are ordinarily concerned. The book of 355 pages, contains 60 illustrations and 27 tables, the former including 21 reference maps and 16 sections showing structure and stratigraphy of the state.

Structure, stratigraphy, and geologic history, with particular reference to Post-Triassic events in the coastal province, are presented in detail but with such close tie-in through illustration as to make the discussions and conclusions easily followed. Other aims of the book are to furnish geologists with a simple introductory account of the present status of geological work in the state and to bring into relief some of the major unsolved problems of California geology. This the author has done in a relatively simple technical style.

Squeaks *from the* BULL WHEEL

A recent invention by Wendall Fathers, famed for motor car attachments, is the Oral Speedometer which operates with a phonographic attachment.

At 25 miles it remarks:

"The city speed limit has been passed. Is there a motorcycle policeman behind you?"

At 35 miles:

"Too fast for city driving. We hope you are now in the country."

At 45 miles:

"Your car is still under control but watch the car behind the car ahead of you."

At 50 miles:

"Your responsibilty is increasing. Keep your eyes on the road."

At 60 miles:

"Are your insurance premiums paid to date?"

At 70 miles:

"You drive—this attachment will do the praying."

At 80 miles:

Probably someone will have this car repaired. If so, we thank you for the sale of another speedometer to replace this one which in a few moments is going to hell along with you."

Two expert pickpockets were strolling along the road together.

Every now and then one of them would stop, take out his watch and look at it.

His companion began to get annoyed.

"I say, Jim," he said, "what's up with you? Why d'yer keep looking at your ticker? Ain't it going or something?"

"I'm not looking at it to see the time," said the other; "I'm looking at it to make sure that it's still there!"

"I see you advertised your saxaphone for sale," said the friend.

"Yes," he sighed, "I saw my neighbor in the hardware store yesterday buying a gun."—

An actress, out with a road show, when she retired on the last night in April left an early call order with the girl at the telephone desk.

"To catch a train?" asked the girl pleasantly.

"For what other reason does one leave an early call?"

"Oh, sometimes one is to be queen of the May," suggested the girl, still pleasantly.—

The young wife was in tears when she opened the door for her husband. "I've been insulted," she sobbed. "Your mother insulted me."

"My mother," he exclaimed. "But she is a hundred miles away."

"I know, but a letter came for you this morning, and I opened it."

He looked stern. "I see, but where does the insult come in?"

"In the postscript," she answered. "It said: 'Dear Alice, don't forget to give this letter to George.'"

"Does your wife object to your smoking in the house?"

"She objects to my smoking anywhere; she says it's too expensive having both of us do it."

"What is the difference between electricity and lightning?" the teacher asked.

"You don't have to pay for lightning," came the prompt reply from a bright pupil.

A recent convert in a colored church was very anxious to prove his piety and he went to the preacher and told him so. The preacher then asked: "What do you want to do?"

The convert replied: "Ah is ready to do anything de Lord asks of me so long as it's honorable."

Stranger—Well, how are things around here?

Native—They must be improving. All the farmers wish they could get government jobs and all the government men wish they could be farmers.

Friend—I met your husband today and he was telling me he is in love with his work.

Wife—Is that so? I must drop around to his office and see about it.

Auto License Examiner—Madam, if your car stalled on the car track, what would you do?

Madam—Phone my husband to come and fix it. He can make any machine go.

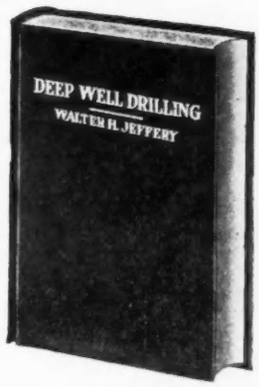
Teacher—Robert, what do they raise in Cuba?

Robert—I know, but I don't want to say it. Mother tells me I mustn't talk rough.

THIRD EDITION of the Well Known Book . . .

DEEP WELL DRILLING

by **WALTER H. JEFFERY**



Re-written, revised and enlarged by the addition of the following New Chapters:

Geophysical Prospecting and Air Mapping.
Straight Hole Drilling and the Treatment of Crooked Holes.
Water Supply.
The Gas-Air Lift Method of Producing Oil.
A. P. I. Codes.

Preparatory to writing the new book, the author spent weeks in a first hand study of modern methods of drilling by the rotary system, and of completing wells, controlling high pressures and operating wells in the deep fields of California and Oklahoma.

The third edition contains 816 pages, 150 pages more than the second edition, and 452 illustrations, but the price is the same, $6.00.

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GULF PUBLISHING COMPANY

3301 BUFFALO DRIVE **HOUSTON, TEXAS**

S. M. Jones Opens East Texas Branch

S. M. Jones Company, Toledo, Ohio, announces the opening of an office to facilitate the handling of East Texas business at 214 Laird Building, Kilgore, Texas. L. J. Pundt, Gulf Coast factory representative, and J. G. Litherland, Louisiana and Arkansas factory representative, are combining their time in East Texas and may be reached at the above office.

Opalite Sales Company Is Formed in Houston

Opalite Sales Company, 1121 North San Jacinto Street, Houston, recently was formed to take over sales and distribution of Opalite and Wyo-Jel in the Mid-Continent and Gulf Coast territories.

Harry Cookston, formerly salesman in the Gulf Coast for the Gulf Coast Machine and Supply Company, Beaumont, has resigned to become associated with the Bettis Sales Company, Houston, Texas.

Joe P. Beer, shop superintendent of the Regan Forge & Engineering Company, San Pedro, California, spent several days in Houston recently visiting his mother.

E. F. (Gene) Goggins, formerly general manager for the Bettis Sales Company, has resigned to give his full time to the Gulf Engineering Company, a new concern of which he is president. Headquarters of the company will be in Houston, address to be announced in a few days.

Pumps

Triangle Pump Company, 3204 Cherry Avenue, Long Beach, California, announces availability of a booklet titled "Neilson Pumping Equipment," which deals with inverted traveling tube pumps, plunger assemblies, inverted insert sand pumps, "B & N" pumps, gas and oil separators, and casing and tubing protectors.

Metal Chart

The International Nickel Company, Incorporated, 67 Wall Street, New York, New York, has available for engineers a circular chart which shows at a glance the alloy steel compositions and treatments required to develop yield points up to 175,000 pounds per square inch in section sizes varying from one to 12 inches. The figures may be used as a general guide to the selection of steels for bars, shafting and forgings of single shape.

Metallizing

The Metallizing Company of America, Incorporated, 1218 Long Beach Avenue, Los Angeles, California, has prepared a 20-page booklet covering the metallizing process, its applications, advantages, and accessory equipment. This booklet covers the process fully, and the applications that cover each field, listing objects coated, type of metal used, and purpose of coating.

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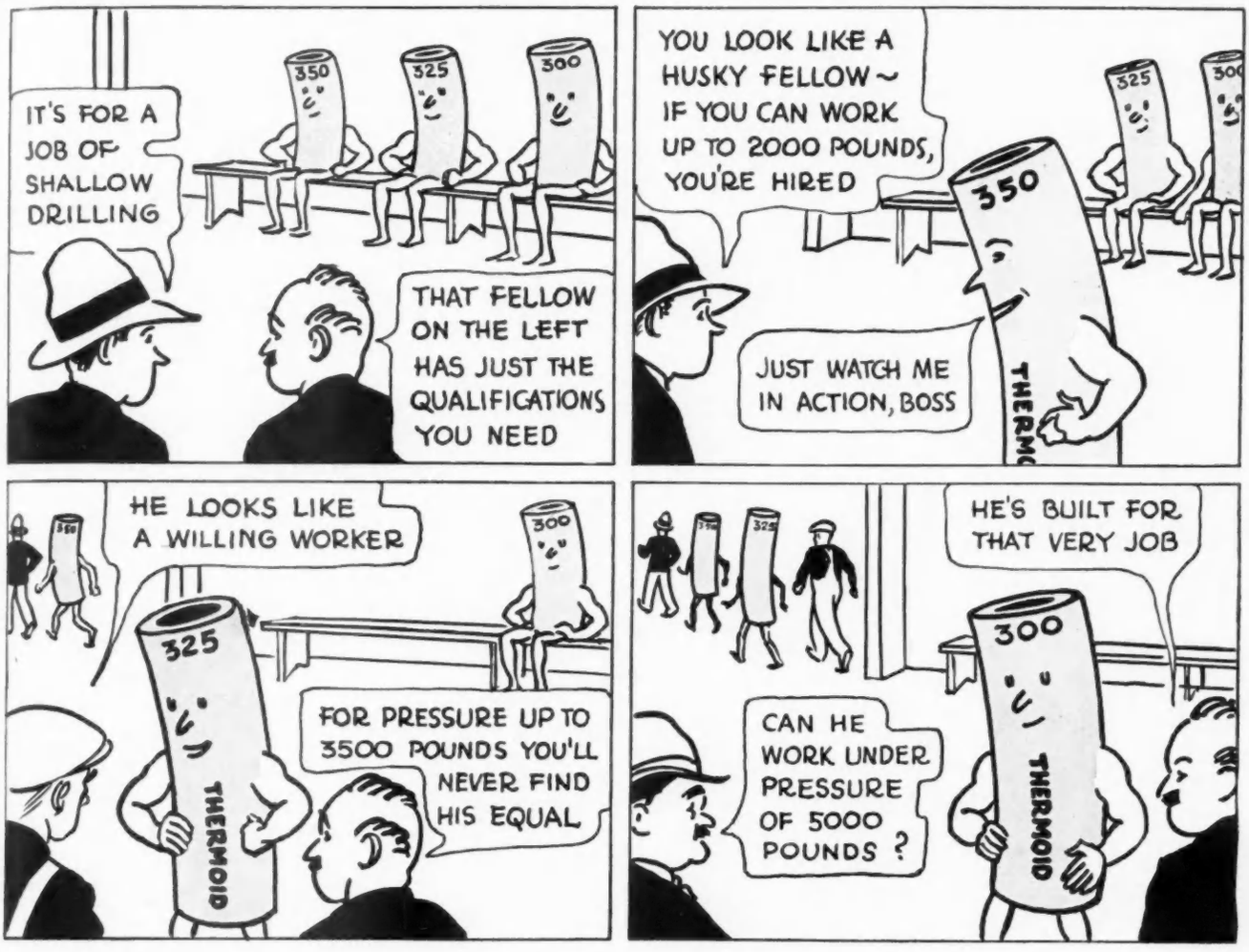
A JOB FOR EACH HOSE AND A HOSE FOR EACH JOB


IT'S FOR A JOB OF SHALLOW DRILLING
350
325
300
THAT FELLOW ON THE LEFT HAS JUST THE QUALIFICATIONS YOU NEED
YOU LOOK LIKE A HUSKY FELLOW ~ IF YOU CAN WORK UP TO 2000 POUNDS, YOU'RE HIRED
JUST WATCH ME IN ACTION, BOSS
THERMOID
HE LOOKS LIKE A WILLING WORKER
FOR PRESSURE UP TO 3500 POUNDS YOU'LL NEVER FIND HIS EQUAL
HE'S BUILT FOR THAT VERY JOB
CAN HE WORK UNDER PRESSURE OF 5000 POUNDS ?

You wouldn't send a boy to do a man's work or put a man at a job that a boy could handle. Either would be poor business . . . just as poor business as trying to adapt a hose to the job *instead of picking the hose best fitted to your individual requirements.* That's why we say, use Thermoid Rotary Hose . . . "350" for pressures up to 2000 pounds; "325" for jobs where the pressure gauge doesn't exceed the 3500 mark; "300" for deep drilling and pressures up to 5000 pounds. Hose built for the job . . . as only Thermoid can build it . . . does the job more efficiently—and economically.

Let us tell you all about Thermoid Rotary Hose . . . and get the full facts concerning Thermoid Oil Country Belting . . . Steam Hose . . . Water Hose . . . Fire Hose . . . Suction Hose . . . Air Hose . . . Brake Lining . . . Packings . . . Stuffing Box Rings.

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BELTING · PACKINGS
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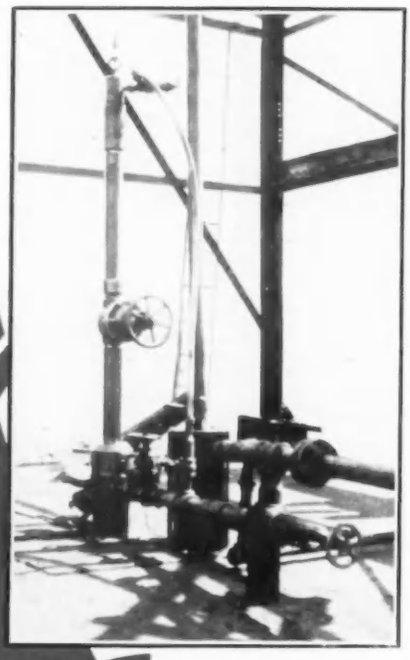
When "WELL GAS" Gives Out

. . . Operation CAN BE MAINTAINED with the

HUGHES Plunger Lift



A well will often operate with the Hughes Plunger Lift, long after natural flow has ceased. When well gas falls off, additional gas supplied to casing will maintain operation without any other changes.

This new method avoids excessive maintenance expense resulting from high pressures, close fits, and severe alternating stress heretofore encountered in deep well pumping.

3" HUGHES PLUNGER LIFT
ON
GULF PROD. CO.'s McELROY No. 82 AT McELROY (CRANE COUNTY) TEXAS
DEPTH OF WELL—2976 FEET
INSTALLED—MAY 1, 1931

Tubing Seat at	May 7, 1931	June 23, 1932
Production	2790 feet	2950 feet
Strokes Per Day	202 bbls. per day	113 bbls. per day
Input Gas-Oil Ratio	240	176
Well Gas-Oil Ratio	None	None
Casing Pressure	1390 cu. ft. per bbl.	1737 cu. ft. per bbl.
Oil Density at 60 deg. F.	60 lbs. per sq. in.	61 lbs. per sq. in.
Saybolt Viscosity at 100 deg. F.	.374	.374
	52 sec.	52 sec.

NOTE: Production on the beam just prior to installing Plunger Lift was 180 barrels per day with a gas-oil ratio of 2140 cubic feet per barrel.

Write for Complete Information

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